THE NAVAL ANNUAL

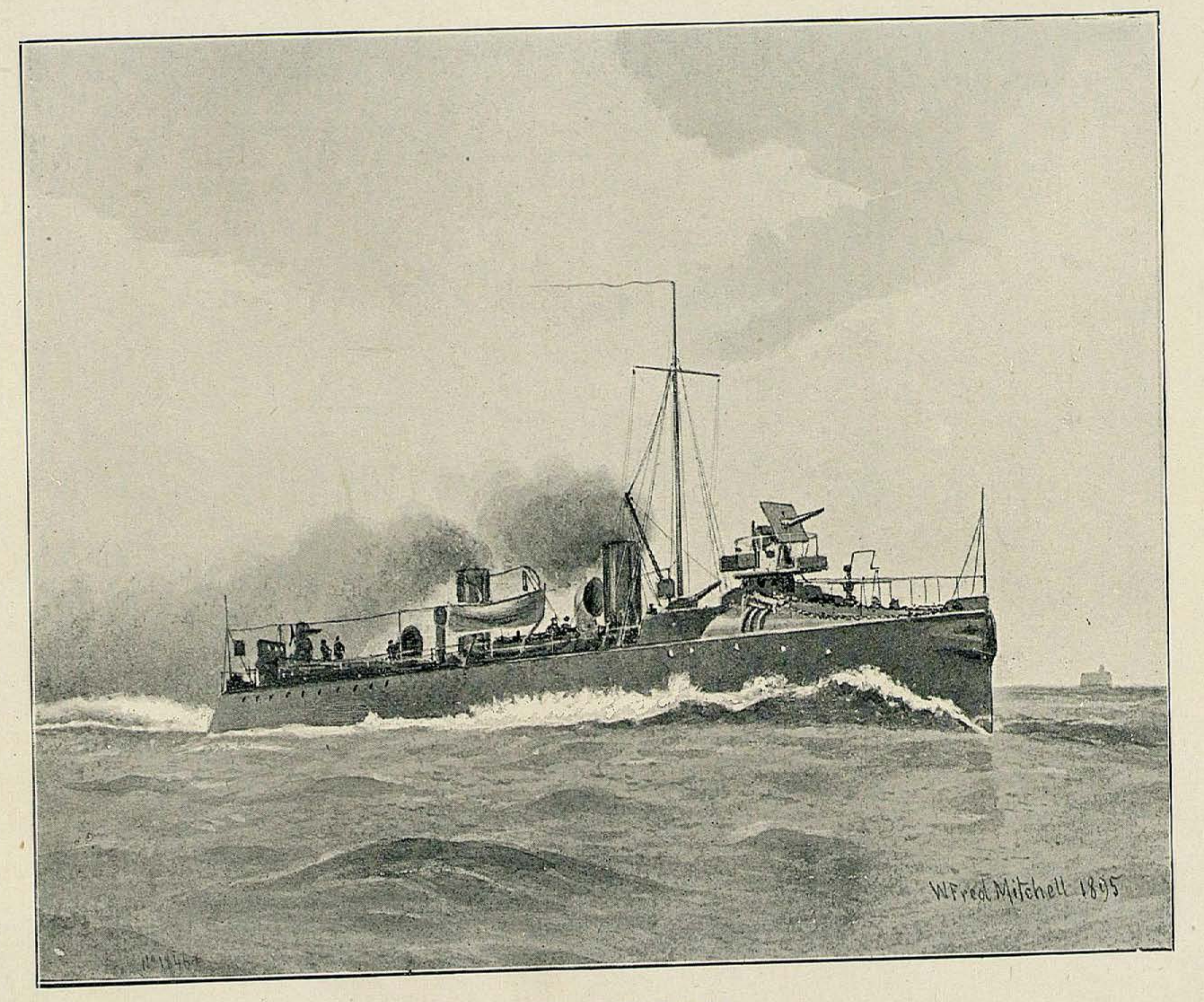
LORD BRASSEY

K.C.B.



NINTH YEAR OF PUBLICATION

J. GRIFFIN & Co. PORTSMOUTH



H.M.S. "DARING."

THE

NAVAL ANNUAL,

1895.

EDITED BY

T. A. BRASSEY.

PART I.—Lord Brassey, K.C.B.; Commander C. N. Robinson, R.N.; Messrs. Laird-Clowes, Harrison Moore, J. R. Thursfield, E. Weyl, and the Editor.

PART II.—F. K. Barnes, M.I.N.A.; W. Laird-Clowes.

PART III.—Captain Orde Browne, late R.A., Lecturer on Armour to the R.A. College.

PART IV.—Statistics, Official Statements and Papers.

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Sir Walter Raleigh, "*Discourse of the first invention of ships.*"

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PORTSMOUTH:

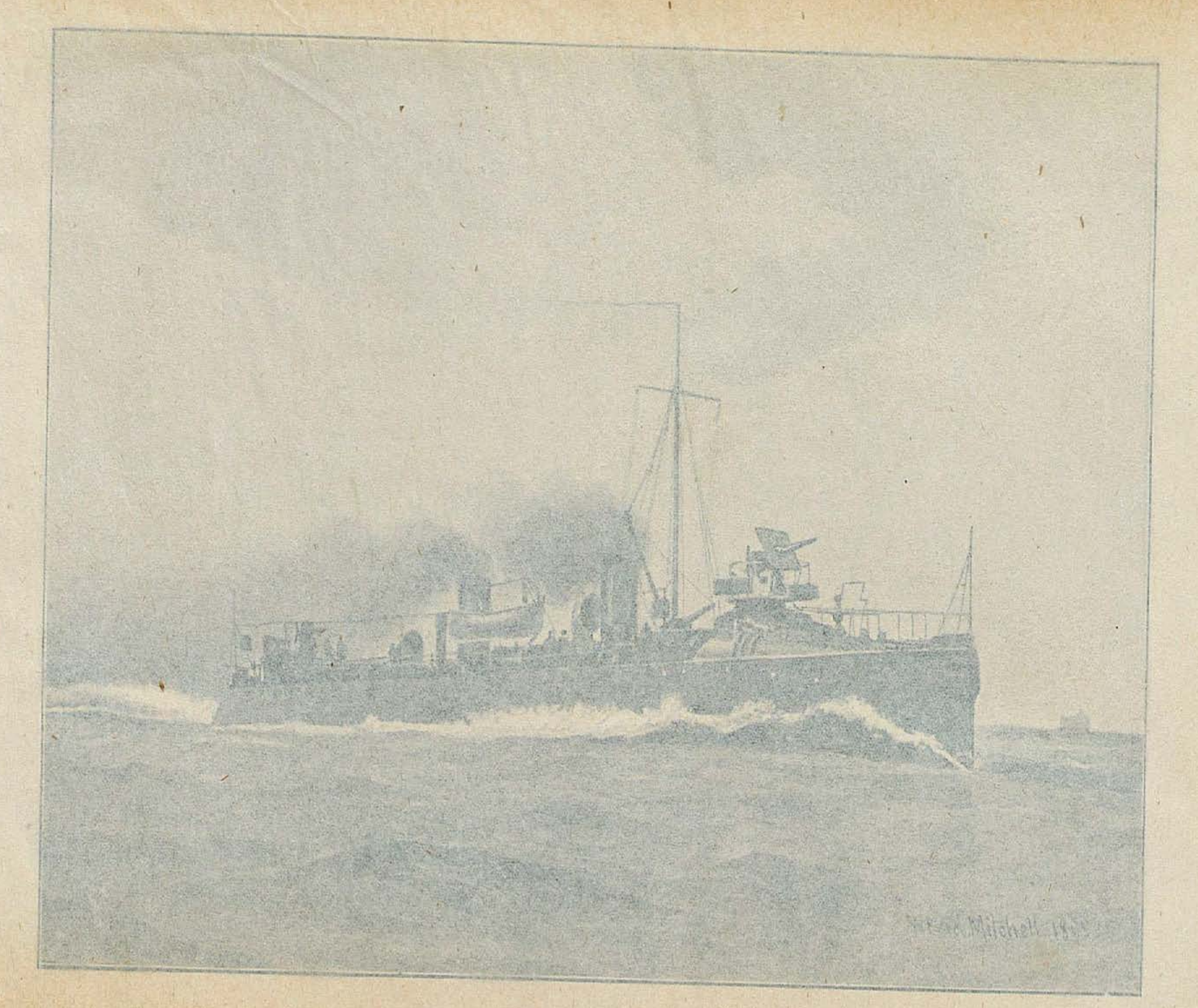
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PREFACE.

THE size of the present volume is considerably less than that of the *Naval Annual* for 1894, owing to the fact that the work has not been duplicated as it was last year in Parts I. and V. through the absence of Lord Brassey abroad, and that no foreign manœuvres have taken place of sufficient importance to warrant a lengthy description from the pen of Mr. Thursfield. During the past year the attention of those who are interested in naval matters has been largely occupied with the war between China and Japan. The battle of the Yalu, or, as Mr. Laird-Clowes prefers to call it, the battle of Hai-yun-tau, and other incidents of the war are fully discussed. That few, if any, new lessons can be drawn from the war is the opinion of a competent contributor who wishes to remain anonymous. Mr. Harrison Moore, the professor of law in the University of Melbourne, is our only other new contributor.

We have been fortunate in securing a large number of drawings of new ships. The Admiralty have kindly furnished us with drawings of the Majestic and Eclipse classes. A drawing and information with regard to new Spanish ships has been sent by Mr. J. McKechnie, the manager (under Sir Charles Palmer, M.P.) of the works at Bilbao. The plates in Part II. have been in every case redrawn, and are produced by a new process. We trust that the improved clearness of the plates will be appreciated by our readers.

In the work of compilation—more especially in Chapter I.—we have as usual to acknowledge our indebtedness to the naval correspondents of the public press.

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* In the plans illustrating this article the spellings are not strictly correct, but are so in the letterpress, which the author had an opportunity of revising. The difference, however, is in no way important or misleading.

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PART I.

Progress of the British Navy, 1894–5.

The history of the progress of the British Navy during the year 1894–5 is not remarkable, as was that for 1893–4, for large additions to the fighting strength of the Navy. No armoured ships have been completed, but the remaining ships of the Naval Defence Act programme, viz., five second-class cruisers of the Astrea class, and five torpedo-gunboats, have been added to the Navy. Several of that valuable class of vessel, the torpedo-boat destroyer, have been completed, and have attained very high speeds on their trials. The success of the Daring, Ferret, and their sisters, the rapidity of the construction of the Majestic and Magnificent, which were floated out of dock within a year from the laying of their keelplates, and the commencement of what is now generally known as the Spencer programme, are the most noteworthy incidents of the year 1894–5.

Ships completed Second-class cruisers.

The five second-class cruisers completed are the Charybdis, Flora, Forte, Fox, and Hermione. The particulars of their trials, as well as of the sister ships completed in the previous year, are given below :—

Ship.	Natural Draught.					Forced Draught.				
	Mean draught on trial.	Air in inches.	I. H. P.	Revs. per minute.	Speed. Knots per hour	Mean draught on trial.	Air in inches.	I. H. P.	Revs. per minute.	Speed. Knots per hour
	ft. in.					ft. in.				
Astrea . .	18 10½	·44	7063	130·5	19	18 9½	1·44	9151	138·9	19·75
Bonaventure	18 11	·44	7423	132·2	19·2	18 9	0·877	9365	142·9	20
Cambrian .	19 1	·48	7164	131·8	19·4	19 0½	1·09	9259	142·8	20·44
Charybdis .	18 11½	·57	7125	127	19·3	19 0	1·65	9137	138	20·5
Flora. . .	18 0½	·45	7211	133	19·1	18 1½	1·21	9356	142	20·1
Forte . .	19 3½	·4	7427	130	18.65	19 2	1·12	9385	139	19·85
Fox . . .	18 3	·3	7049	130	19	18 0½	1·3	9058	141	19·9
Hermione .	18 11	·45	7393	129	19	18 8	0·94	9272	137·4	19·5

The second-class cruisers of the Astrea type have had sponsons fitted for the forward and after 4·7-in. guns on each broadside, their bow and stern fire being thereby considerably increased.

Torpedo-gunboats

Five enlarged torpedo-gunboats of the Sharpshooter type have been completed during the year. The Sharpshooter displaced 735 tons. The dimensions of the Dryad class are :—Length between perpendiculars, 250 ft. ; beam, 30 ft. 6 in. ; displacement, 1070 tons, at a mean draught of only 9 ft. The Dryad class have a high poop in addition to the high forecastle of the torpedo-gunboats which

preceded them. The following description of the machinery of the Dryad is from the *Engineer* :—

"The propelling machinery consists of two sets of triple expansion engines, each set having three inverted cylinders, and three cranks, driving a gun-metal screw propeller, with three adjustable blades. The cylinders are 22 in., 34 in., and 51 in. diameter respectively, each with a piston stroke of 21 in. Steam is supplied by four boilers of the locomotive marine type, designed for a working pressure of 155 lbs. per sq. in., and adapted to be worked under forced draught; the contract power to be developed by the engines being 2500 indicated horse-power under natural, and 3500 under forced draught. The natural and forced draught trials of the vessel took place, the former on the 13th and the latter on the 26th of April. The power realised on both trials, it will be seen from the results recorded, considerably exceeded those contracted for; the engines ran throughout with remarkable regularity, and worked most satisfactorily. The coal bunker capacity of the Dryad is 100 tons. She will be manned by a crew of 115 officers and men; her armament will comprise two 4·7-in. and four 6-pounder quick-firing guns, and five tubes for discharging Whitehead torpedoes. The total cost of building her will be £73,491."

The results of the official trials of the Dryad class, and of three torpedo-gunboats whose trials were not reported last year, are as follows :—

Ship.	Natural Draught.					Forced Draught.				
	Mean draught on trial.	Air in inches.	I. H. P.	Revs.	Speed by log.	Mean draught on trial.	Air in inches.	I. H. P.	Revs.	Speed by log.
	ft. in.				Knots.	ft. in.				Knots.
Dryad . .	10 6	·96	2696	210·3	16·6	10 3½	2·28	3709	242	18·2
Halcyon . .	9 5⅛	1 0¼	2557	227	16·9	9 3	2	3546	248	17·7
Harrier . .	9 11½	·86	2709	229	18	9 9½	1·77	3608	254	19
Hazard . .	9 0	·82	2621	228	17·1	9 0	2·19	3734	260	19
Hussar . .	9 10	·83	2544	224	17·5	9 3	1·69	3553	253	19·7
Circe . . .		·89	2620	224	18·25		1·9	3508	249	19·3
Hebe . . .	9 8¼	·77	2702	221	17·8	9 8¾	2	3566	246	19
Renard . .	9 8	·83	2609	218	17·6	9 6½	2·57	3962	254	19·4

The above results do not compare favourably with the results obtained with foreign torpedo gun-boats of recent construction. The D'Iberville, of 925 tons, steamed 21·5 knots, and the Patria, built by Messrs. Laird for the Argentine Government, 20·4 knots. Foreign Governments have been able to profit by our experience with this class of vessel. The Dryad was commissioned for the manœuvres, and has since left for the Mediterranean station.

The Sharpshooter, which has had her original boilers replaced by new tubular boilers, made by Messrs. Belleville, of St. Denis, has completed her trials satisfactorily. The *Naval and Military Record* says: "The mean results of three hours' steaming were: Revolutions, starboard 253·4, port 256·1; indicated horse-power, 3238; air pressure, 0·13th of an inch; speed by log, 19 knots. The record of coal consumption was 2·04 lb. per hour for each indicated horse-power. It is stated that there would be no difficulty in attaining 3500 horse-power if the forced draught-power could be slightly increased; and as this might be easily effected by increasing the size of the existing deck cowls or fitting additional ones, no doubt the Admiralty will give directions for the alteration to be carried out." Sharpshooter.

Of the forty-two torpedo-boat destroyers included in the New Programme, a list of which was given last year, eighteen are now completed. The first six torpedo-boat destroyers were fitted with a bow torpedo-tube; but at the high speed which these boats have attained there is danger of the torpedo from the stem tube being overrun. The later destroyers have no stem tube, but will be furnished with revolving tubes on deck. They will carry an additional armament of two 6-pounder quick-firers. Torpedo-boat destroyers.

The extraordinary speed attained by the Havock and Hornet was chronicled in the *Naval Annual* of 1894; but the performances of the earlier destroyers have been beaten by the boats of various builders during the past year.

The following are the results of some of the official forced draught trials:—

Ship.	Mean draught on trial.		Air pressure.	I. H. P.	Revolutions.	Measured mile Speed.
	ft.	in.	inches.			Knots.
Hornet	5	9½	1·6	3884	392	27·313
Havock	5	11	3·66	3497	359	27·177
Ardent	6	0⅝	2·75	4306	396	27·94
Daring	6	3⅜	3·25	4408	379	27·706
Decoy	6	3⅛	3·5	4009	364	27·641
Ferret	5	9¼	4·1	4474	360	27·519
Lynx	5	9¼	4·18	4494	372	27·117

On the builders' trials it is reported that the Ferret, built by Messrs. Laird, attained a speed of 27·8 knots; the Rocket, by Messrs. Thomson, 28·25 knots; the Boxer and Daring, by Messrs. Thornycroft, slightly over 29 knots. The trials of the Daring were described at length in the *Engineer*, and, as she is a specimen vessel of her class, the following quotations will not be out of place here:— Daring.

"The Thornycroft engines perform their work visibly to perfection, but after all it is the Thornycroft boilers which keep them going at some 4800 horse-power, and abundantly supply them with

steam at about 250 lbs. on the square inch, as far as can be judged from the needle of the gauge, which is in a state of agitation with the varying velocity in the steam pipe. These boilers are three in number, of the Thornycroft improved water-tube type, and are capable of raising steam from cold water in fifteen minutes: in fact, we start with one boiler, and the other two are not set going till some way down the river. An automatic system of feed has been adopted, by means of float gear of the nature of a ballcock in the interior, which must save a deal of anxiety among the stokers, whose whole energies are required elsewhere during the full speed runs.

"Together with the freedom from vibration, the absence of any great bow wave or wake disturbance is very remarkable; the wake shows the spinning effect of the propeller very clearly, but there is no upheaval of the water to notice, and, to all appearance, the wake is as flat at full speed as at an ordinary fifteen knots. This smoothness of wake and the absence of squatting must be attributed to the Thornycroft form of stern, which above the water-line is of full midship breadth, and forms a chamber drawing a few inches of water; this chamber is utilised for the steam steering gear and the captain's cabin. The propellers are thus covered in, and can work close to the surface of the water without splashing, while squatting is minimised by the large water-line area astern, which calls into play an extra buoyancy for slight changes of trim.

* * * * * * *

"The larger size of the destroyers, as compared with the torpedo-boat, enables them to maintain their speed much better in rough water; and to make it more difficult for a torpedo-boat to escape, the Thornycroft boats are fitted with a special system of double rudders, which give them exceptional manœuvring power, and enable them to be steered astern quite as well as ahead."

The turning diameter is about 500 ft., and at 210 revolutions the Daring could circle ahead in 1 min. 56 secs., and astern in 2 min. 50 secs. The actual records of the three last runs at full speed are as follows:—

	Time.	Speed.	Mean.
1. Against tide ...	2 m. 7·6 s. ...	28·214 knots	... 28·656
2. With tide ...	2 m. 6 s. ...	28·571 knots	
3. Against tide ...	2 m. 3 s. ...	29·268 knots	

The mean revolutions during these three runs were 387; the mean I.H.P. developed was 4573. The extreme I.H.P. developed for a single run was 4842.

New construction. Renown.

The battleship Renown, which is building at Pembroke, is expected to be launched in May or June. She was laid down in February, 1893, so that she will have been nearly two-and-a-half years on the

stocks at the time of launching. All our battleships are not built as rapidly as the Majestic and Magnificent. One reason for this ship being so long on the stocks is that Pembroke Yard is without proper facilities for doing work on large ships after they are launched, and consequently as much work as possible is done while the ships are on the stocks. The displacement of the Renown is 12,350 tons, or nearly 2000 tons more than that of the Barfleur and Centurion. The speed is about the same, viz. 18 knots, and the main armament is the same, viz. four 10-in. 29-ton guns, mounted on high angle fire mountings. The auxiliary armament is more powerful and better protected. It consists of ten 6-in. and eight 12-pr. Q.-F. guns, as compared with the ten 4·7-in. and eight 6-pr. Q.-F. guns of the Barfleur. The whole of the 6-in. guns are in casemates, three on each broadside on the main deck, and one at each angle of the superstructure of the upper deck—two being able to be fired right ahead and two right astern. The eight 12-pounders are mounted four on each broadside between the 6-in. guns on the upper deck, and are thus protected by the casemates from a raking fire.

The Renown is protected on the same principles as the Majestic and Magnificent, by a deep belt of armour on the side, and by an armour deck curved down to the lower edge of the belt. The thickness of the belt, which is in two strakes, is—lower one 8 in., and the upper one 6 in. The thickness of the armoured bulkheads is 10 in. and 6 in., and of the armour on the barbettes is 10 in. The thickness of the armour deck, which has a very steep curve downwards to the lower edge of the armour belt, and thus increases the resistance to penetration, is 3 in. on the slopes near the side, and 2 in. on the central portion.

New battleships. The dimensions of the nine first-class battleships now building, seven of which have been laid down during the past year, are identical—length between perpendiculars, 390 ft.; extreme breadth, 75 ft.; mean draught, 27½ ft.; displacement, 14,900 tons.

Majestic and Magnificent. The Magnificent was laid down at Chatham on December 18th, 1893, and was floated out of dock on December 19th, 1894, weighing 6100 tons. The Majestic was laid down at Portsmouth on February 4th, 1894, and floated out of dock on January 31st, 1895, weighing 7300 tons. This rate of construction is absolutely unprecedented, and reflects the greatest credit on the organisation of the Government establishments, on the dockyard officers, and on the dockyard workmen. It was observed in the case of the Royal Sovereign, which was seventeen months on the stocks, that the rate at which she was built could not be considered as normal, an observation which was justified by the length of time which the other ships of the class took to build. The same observation may, perhaps, be

repeated in the case of the Majestic and the Magnificent. It is hoped that both ships will be ready for their trials before the end of the present year.

Some description of these vessels was given in a Parliamentary paper printed in the *Naval Annual* of last year. Through the courtesy of the Admiralty we have been furnished with a drawing showing the disposition of the guns and armour. Admirable descriptions of the improvements adopted in respect to them have appeared in the *Times* and *Engineer*, from which the following is condensed:—

Armament.

The Majestic class displaces about 700 tons more than the Royal Sovereign. Their armaments are as follows: Majestic—four 12-in. 50-ton, twelve 6-in. Q.-F., sixteen 12-pr. (3-in.) Q.-F., and twelve 3-pr. Q.-F.; Royal Sovereign—four 13·5-in. 67-ton, ten 6-in. Q.-F., sixteen 6-pr., and twelve 3-pr.

The new wire guns of the Majestic class, though lighter, have as great penetrating power as the 67-ton guns of the Royal Sovereign. The weight of projectile is of course less. They have a greater command of fire, being mounted at 27 ft. above the water-line as compared with 23 ft. in the Royal Sovereign. They can be worked by hand, and are protected by a hood over the barbette in the same way as the principal armament of the Barfleur and Centurion. The guns of the Royal Sovereign are not so protected. "For the principal armament," says the *Engineer*, "an axial ammunition trunk has been provided, so that the charge can be brought up from the magazines below when the guns are in any position of training. This is in addition to the ordinary hoist for the fixed position, and therefore in action the captain of the turret would have the option, after firing a round, of bringing his guns back into the ordinary loading position or keeping them on the object until ready to fire again." The Majestic carries two more 6-in. quick-firers than the Royal Sovereign class; and all the 6-in. guns are mounted in 6-in. Harveyed steel casemates, whereas only four of the Royal Sovereign's guns are similarly protected, the six 6-in. guns on the upper deck being much exposed. It is difficult to estimate the additional value of the Majestic's auxiliary armament, owing to the superior protection provided. The 6-in. guns of the Majestic are disposed in the same way as already described in the case of the Renown, but an additional 6-in. gun is mounted on the main deck on each side. The sixteen 12-pounders of the Majestic also represent a great advance on the 6-pounders of the Royal Sovereign class. Four of these are mounted on each broadside on the upper deck between the casemates of the 6-in. guns.

Torpedo-tubes

Five torpedo tubes will be fitted as compared with seven. In the latter case only two were submerged, in the former four will be submerged, and only one, in the stern, above water.

New features in the system of protection adopted have been incidentally alluded to already in describing the disposition of the armament. The armour of the new battleships consists throughout of Harveyed steel, which has a resisting power about fifty per cent greater than ordinary compound armour. The difficulty anticipated by many in preserving the proper curves of the plates during the process of hardening has been successfully overcome. Protection.

The armour on the side is 220 ft. long, 16 ft. in depth, and consists of 9 in. of Harveyed steel. Armoured bulkheads at each end of the belt are inclined forward and aft respectively at a sharp angle to meet the pear-shaped barbettes, and form with these an armoured citadel rather more than 300 feet from apex to apex. This arrangement will be better understood by an inspection of the plan in Part II. The thickest armour on the bulkheads is 14 in. The barbette armour is also 14 in. thick. "The Majestic," the *Times* justly points out, "shows a very large area of side protection—in fact, the ship may be described as side-armoured in contradistinction to the term belted. The change bears evidence to the growing appreciation of the value of rapid fire and high explosive shells, as well, perhaps, as advance in the manufacture of armour-plates. Whereas a few years ago the warship designer devoted most of his capital in displacement to a thick armoured belt of small area, designed to prevent penetration by the few heavy projectiles, he now fears rather the rapid destruction of large areas of side by smaller shot and shell projected with immense rapidity." Side armour.

"The armoured deck," says the *Engineer*, "instead of being a mere flat roof to the citadel, curves downward on each broadside to the armour shelf, or lower edge of the side armour, so that, in addition to having the side armour to penetrate, a projectile would meet with 4 in. of steel set at an angle which would give a further reinforcement of about 6 in. to pass through. The height of the curve of the armoured deck is about 9 ft., and it extends unbroken from apex to apex of the citadel. It will thus be seen that the outer edge of the armoured deck stretches from stem to stern in a horizontal line. This is a most invaluable feature of the new designs, and was never attempted before, the horizontal line of the armoured deck being raised above the citadel in all earlier battleships." Deck.

"The triangular space," says the *Times*, "above the armoured deck where it dips below the water will be filled with some water-excluding substance, so that if the side is pierced and the deck remains uninjured, water will not flow in. The usual armour shelf for supporting the side armour is not necessary with this arrangement, as the bottom edge of the vertical armour rests on the outer extremity of the deck.

The support to the side armour is very efficient. It consists, firstly, of about 4 in. of teak, at the back of which are two thicknesses of skin plating. The framing at the back of the armour consists of deep web frames strengthened by reverse angles. These frames extend vertically from the main deck, past the middle deck, to the lower edge of the armoured deck, being attached to the deck beams by large bracket-plates, the whole forming a structure strong enough to resist the blows of hostile projectiles, yet it is comparatively light."

Other features of improvement are (1) the inner skin, which extends to two bulkheads 8 or 9 ft. forward and aft of the apices of the citadel; and (2) the plated shelter deck, which, as the *Army and Navy Gazette* observes, has vertical plated walls connecting it with the upper decks, so as to form a complete shelter for the upper-deck crews from the observation of men stationed in the enemy's tops. The central line, where the boats are housed, is left open all along, but a wide decked-in portion runs along both broadsides.

Propelling machinery.

In the Magnificent a large experiment is to be made in the application of induced draught. As is well known, a high efficiency is usually obtained from the engines of war-ships by closing the stoke-holds and maintaining a *plenum* by means of rotary fans, thus driving a large volume of air through the fires. With induced draught the fans are placed in the chimneys, and so run as to draw the air through the furnaces by reducing the atmospheric pressure in the uptakes and chimneys. The two sets of propelling engines are of the ordinary inverted three-stage compound condensing type, the cylinders being 40 in., 59 in., and 88 in. in diameter respectively, by 51 in. stroke. They have been constructed by Messrs. John Penn and Sons, of Greenwich, and are very fine specimens of marine engineering, possessing all the most approved modern features of steel castings and forgings, in place of cast or wrought iron, in positions where additional lightness and strength can be obtained by such change. The twin propellers are of gun metal, 17 ft. diameter and 19 ft. 9 in. pitch. The usual auxiliary machinery, electric light machinery, and boat-hoisting winches will also be supplied by Messrs. Penn and Sons. The boilers are eight in number, and are of the ordinary marine type, being 16 ft. 1 in. diameter and 9 ft. 3 in. long, each containing four furnaces. The working pressure will be 150 lbs. per square inch. The main steam pipes will be of steel. The engines are designed to develop 10,000 horse-power with natural draught and 12,000 horse-power with forced draught, the corresponding speeds being 16½ and 17½ knots. The total coal capacity is 1800 tons, which should suffice for twenty-eight days steaming at 10 knots.

The coal carried at load draught is 900 tons. There will be two military masts with fighting tops on each, which carry eight 3-pounder quick-fire guns.

The estimated cost of the Majestic is £982,527 (including £70,100 for armament). The complement will consist of 757 officers and men.

It will be admitted alike by the advocates of large and of moderate dimensions that the battleships of the Majestic class are most powerful fighting machines. They represent a great advance both in powers of offence and defence on the ships of the Royal Sovereign class. In offensive powers they may have their equals or even their superiors in the American and some of the Italian battleships; their defensive qualities for close action are probably, as claimed by their designer, unrivalled.

Of the other ships of the Majestic class, the Hannibal was laid down in April at Pembroke, the Victorious in May at Chatham, the Prince George in September at Portsmouth, the Jupiter in October at Messrs. Thomson's yard on the Clyde, the Mars in June at Messrs. Laird's at Birkenhead. These ships are making rapid progress. The Illustrious and Cæsar have been laid down in the docks recently occupied by the Magnificent and Majestic.

Cruisers Powerful and Terrible.

The two enormous cruisers Powerful and Terrible were described at pp. 11–12 of the *Naval Annual* of 1894. One is being built at Barrow (Naval Construction and Armaments Co.) and the other at Messrs. J. and G. Thomson's works on the Clyde. These vessels are supposed to have been designed in answer to the Russian Rurik. Their dimensions may be compared not only with that ship, but with the French and American commerce destroyers, which are considerably smaller, but with which they will also have to deal.

	Powerful and Terrible.	Rurik.	D'Entrecasteaux.	Columbia.
Displacement, Tons	14,200	10,923	7960	7475
Length	500 ft.	396 ft. 6 in.	384 ft.	412 ft.
Breadth	71 ,,	67 ft.	58 ft. 6 in.	58 ft. 2 in.
Draught	27 ,,	26 ,,	23 ,, 6 ,,	22 ,, 6 ,,
Horse Power	25,000	13,250	14,000	21,500
Speed, Knots	22	18	19	22·8
Coal capacity, Tons	1500 or 3000	2000	1000	2400
Coal endurance at 10 knots	—	20,000	—	13,000
Armament	2 9·2-in.	4 8-in.	2 24 cm. (9·5-in.)	1 8-in.
	12 6-in. Q.F.	16 6-in.	12 14 cm. (5·5-in.) Q.F.	2 6-in.
	16 12-pr. do.	6 4·7-in. Q.F.	—	8 4-in. Q.F.
	19 small Q.F. and M.	18 small Q.F.	16 small Q.F.	20 small Q.F.
Protection	4–6-in. deck	10-in. belt	4-in. deck	4–2½-in. deck

Second-class cruisers.

Of the nine second-class cruisers included in the programme of last year, three are building in the Government dockyards, the remainder in private yards. The Eclipse was launched at Portsmouth in 1894, exactly seven months after her first keel-plate was laid. The Minerva was laid down at Chatham in December, 1893, but has not yet been launched. The Talbot was laid down at Devonport in March, 1894. The Diana and Venus are building at Fairfield. The Dido and Isis were laid down at the London and Glasgow Co.'s yard; the Doris and Juno at Barrow in October 1894. The displacement of these cruisers would seem to place them in the rank of first-class cruisers.

Their principal dimensions are:—Length, 350 ft.; beam, 35 ft.; displacement, 5600 tons. Their armament consists of five 6-in., six 4·7-in., and eight 12-pdr. quick-firers, which are to be mounted: one 6-in. gun on the forecastle, one 6-in. on each side of the waist forward, one on each side aft. The 4·7-in. guns will be mounted on the broadside. The 12-pounders: one on each bow, two aft, and two on each side amidships between the 4·7-in. guns. This disposition of the armament gives a largely increased end-on fire as compared with our other second-class cruisers. For bow-fire the Talbot class can employ three 6-in. guns and two 12-prs., and for stern-fire two 6-in. guns and two 12-prs.; while three 6-in., three 4·7-in., and four 12-pr. quick-firers can fire 60 degrees before or abaft the beam.

"The Eclipse is wholly of steel," we quote from the *Engineer*, "with the exception of the stern post, rudder-frame, and ram-shaped stem, which, as is usually the case, are strong phosphor-bronze castings. The framing is a combination of the bracket and transverse systems throughout the length of the double bottom; but before and abaft it, and above the protective deck, the frames are formed of '*Z*' bars, with intermediate angle frames worked between them above the protective deck. The double bottom extends for a length of about 152 ft., and is well subdivided into water-tight compartments, but the water-tight flats to magazines and shell-rooms practically extend the double bottom well towards the ends of the ship. A strongly-built protective deck, whose maximum thickness is 2½ in., extending throughout the whole length, affords protection to the vital parts, such as magazines, shell-rooms, and machinery, the cylinders of the latter being further protected from shell fire by a sloping Harvey-armoured coaming. The armoured deck is shaped like that of the Vulcan, with a curve so deep as to extend down far over the sides, thus protecting a vertical streak of some 6 ft. or 7 ft. in width. The angle which this armoured deck makes with the side

plating is about 45 deg., hence the 2½-in. plates with which it is covered present a horizontal thickness of 3½ in. of steel to the fire of the enemy. . . .

"The Eclipse has a balanced rudder, which can be actuated by hand power below the protective deck, and by steam power from the bridge, conning tower, and steam steering engine compartment. The steam steering gear is sufficiently powerful to put the helm over from hard-a-port to hard-a-starboard and *vice versâ*, or through a total angle of 70°, in thirty seconds, when the vessel is proceeding at full speed of 19½ knots, with a pressure in the steam pipes not exceeding 100 lb., and the engines exhausting into the atmosphere.

"The conning tower is built of 6-in. nickel steel armour, the top plate being 1 in. thick; the upper part will be fitted with hinged covers all round for sighting purposes. The after shelter deck and forecastle will be connected by a fore-and-aft bridge. Two steel masts with wooden pole topmasts will be fitted, but only slight sail power will be provided.

"The engines, which are under construction in the yard, will be of the triple expansion type, designed to develop 9600 and 8000 indicated horse-power, with and without forced draught respectively. In each of the two boilers rooms, four single-ended cylindrical boilers will be placed, any one of which may be used independently of the other, with steam up to 155 lb. One thousand tons of coal can be carried."

Sloops Torch and Alert.

The Torch and Alert were laid down at Sheerness in December, 1893. They were floated out of dock early in January. They represent a new type of sloop, a class of vessel which it is still considered necessary to build for performing those multifarious police duties in which the British Navy is so largely employed. For war purposes the new sloops are of little more value than the vessels now employed for the police of the seas. Some description of these vessels was given in last year's *Naval Annual*. The following additional particulars are taken from the *Times*:—

"They have been built with steel plating ¼ in. thick, which is covered with teak wood sheathing, 3½ in. thick, to a height of 2 ft. above the water-line. The stem and rudder posts are of phosphor-bronze, and were cast at Sheerness Dockyard. They have no armoured protection, but a steel water-tight deck runs above the boiler and engine rooms, and also forms a division between the upper and lower coal bunkers. Their principal armament will consist entirely of quick-firing guns, the vessels having been designed to carry six 4-in. and four 3-pounder guns, together with two machine guns. Their engines and boilers, which have been

made at Sheerness Dockyard, have been designed to register 1400 horse-power under forced draught, with a speed of 13·25 knots, and 1100 horse-power under natural draught, with a speed of 12·25 knots. They will be fitted with three masts and will carry yards on the square and mainmasts." They will cost about £66,000 apiece (including armament), and should be completed during the coming summer.

Algerine and Phœnix.

Two new sloops, known as the Algerine and Phœnix, of somewhat larger dimensions, were laid down at Devonport in 1894. They will be launched in April or May. Displacement, 1050 tons; length, 185 ft.; beam, 32 ft. 6 in.; draught of water, 11 ft. 3 in. Their armament is the same as that of the Torch and Alert; they carry 160 tons of coal instead of 130.

Bilge keels.

As the result of experience with the Repulse during the manœuvres, all the vessels of the Royal Sovereign class have been fitted with bilge keels. The heavy rolling under certain circumstances of these ships was fully discussed by Sir William White in a paper read before the Institution of Naval Architects last year.

Reconstruction.

Turning to reconstruction, the Northumberland, which has been reboilered, steamed 13·3 knots on her trials with 4281 horse-power. She has had six 4·7-in. quick-firing guns added to her armament, and been fitted with torpedo tubes.

The Impérieuse has made a successful trial of her machinery after her refit. With an air-pressure of ·39 in. and 7501 horse-power, she realised a speed of 16 knots. Six 6-pr. and four 3-pr. quick-firers have been added to her armament.

By the end of the financial year the Dreadnought, Immortalité, Narcissus and Blanche will also have been repaired and refitted.

The refit of the Sultan is proceeding slowly at Portsmouth. She is being furnished with new engines by Messrs. Thomson, and also with new boilers which are designed to give her a speed of 14 knots with forced draught. She will be fitted with military masts and bilge keels. Her main armament will still consist of 12 muzzle-loaders. The new auxiliary armament includes four 4·7-in. and twenty-two smaller quick-firing guns. The total cost of the refit of the Sultan will be £205,000.

The completion of refit of the Monarch will be somewhat delayed. She has successfully been through her steam trials. £135,000 are to be spent on her.

Re-armament.

It has been decided to convert the 6-in., 5-in., and 4-in. breach-loading guns into quick-firers, and to substitute the latter for the former in the battleships and cruisers not already armed with quick-firing guns. All the second class cruisers of the Apollo type are now armed with 6-in. quick-firing guns. The Blenheim, Impérieuse,

Immortalité, and Narcissus have also received their new armament of 6-in. quick-firers.

The Works Vote (Vote 10) of the Navy Estimates for 1894-5 amounted to £650,000, as compared with £380,000 for 1893–4, an increase of £270,000. Upwards of £233,000 of this sum was to be spent on new works at the Home Dockyards. Last year foreshadowed a total expenditure of nearly five millions, the principal items of which were £377,000 for the extension of docks and jetties at Portsmouth; £138,000 for coaling docks and harbour defences at Portland; £405,000 for the Gibraltar Mole and its extension; £366,000 for a new dock at Gibraltar, with an additional £30,000 for magazines; £1,071,000 for dredging and plant in the harbours at Devonport, Portsmouth, and elsewhere; £30,000 for additional buildings at Keyham College, necessitated by an increase in the numbers of Engineer students; and £2,000,000 for extension works at Keyham Dockyard. The main undertakings, begun last year in accordance with this programme, were the new docks at Portsmouth, the harbour defences and docks at Portland, and the dredging of channels to a depth necessary for the biggest of our new battleships. Works 1894–5.

In the speech made by Mr. Robertson in introducing the Navy Estimates for 1895–6 into the House of Commons, a further larger expenditure is proposed. Portland and Gibraltar are to be made proof against torpedo-boat attack, by the construction of breakwaters at a cost of £700,000 in each case. The decision of the Admiralty to make a harbour of 260 acres at the five-fathom depth at the important strategic position of Gibraltar cannot be too highly commended. Naval barracks are to be built at Chatham and Portsmouth at a cost of about £1,000,000. At Dover, a harbour is to be constructed on the lines of recommendations of the Royal Commission of 1844. It will have a total area of 520 acres, 270 acres of which will have a depth of five fathoms. Such a harbour will be invaluable not only to the Navy in time of war, but to the mercantile marine in time of peace. Owing to the increased number of ships in commission in the Far East, an extension of Hongkong Dockyard is proposed by the construction of a small basin and a jetty. The total expenditure proposed in last year's and this year's programme amounts to nearly £9,000,000, which is to be met by a loan provided for in annual bills, and repaid by terminable annuities in thirty years.* Programme for 1895–6.

This large expenditure is due in part to the fact that expenditure on works has been deferred too long, in part to the apprehensions

* For details of proposed works see page 392.

entertained of the dangers from torpedo-boat attack to which an assembling fleet would be exposed when lying at anchor in an unprotected or partially protected anchorage, in part to the increased size of our battleships and increased numbers of our fleets.

Personnel.

Large additions have been made to the numbers voted for the Navy during the past few years. Of a total of 83,400 voted in 1894–95, 76,600 of all ranks were available for sea-service, as compared with 70,500 in 1893–94 and 67,700 in 1892–93. The numbers to be voted in the Estimates for 1895–96 amount to 88,850, of whom 81,508 are available for sea-service. In a subsequent chapter the subject of manning the Navy is fully dealt with. In spite of the large increase in numbers in recent years, and reckoning a large proportion of the Naval Reserve as available for sea-service, we have barely sufficient men, and certainly not sufficient officers, to man the ships built and building. We have no margin to meet the wastage of war.

Programme of construction for 1895–6.

The programme of construction for 1895–96 is given in the First Lord's Statement, which is printed in Part IV. It is proposed to commence four first-class cruisers—improved Blenheims; four second-class of 5750 tons; four third-class cruisers of 2100 tons—improved Barhams; and twenty torpedo-boat destroyers. Owing to the fact that ten battleships are already in hand, no new battleships will be laid down.

CHAPTER II.

The Progress of Foreign Navies.

The war in the East.

The events which have taken place in the Far East have attracted the attention of the whole naval world, and valuable lessons can be drawn from them. If the importance of these events have, with good reason, preoccupied all countries which have commercial and political interests in Eastern Asia, they have also afforded a most striking example of the influence of sea-power on the destinies of a great people. China has been beaten because she has been incapable of fighting on the sea; because since the opening of hostilities she has abandoned to Japan the command of the sea; and has thus allowed the armies of the Mikado to concentrate in Corea. Her land forces had to march immense distances to reach the theatre of war. The large and well-organised armies of the Japanese were performing the same operation without hindrance by sea, and were arriving fresh in presence of the Chinese forces, which were badly equipped, and commanded by incapable officers, who only sought during the campaign opportunities to enrich themselves at the expense of their soldiers and fellow-citizens. Yet, when the strength of the Chinese Navy is taken into consideration, it must be admitted that it should have been able to meet the Japanese Navy on equal terms. The fact that at the battle of the Yalu the victor was not able to get the better of the two battleships, the only well-protected ships in the Chinese Navy, supports this view.

Causes of Chinese defeat.

The real cause of the loss of the command of the sea, and in consequence of the failure of the whole campaign, was that the naval force commanded by Admiral Ting was only in appearance a Fleet. All the ground gained by Captain Lang during his temporary service in China had been lost in a few years. The order and method with which this excellent officer had trained the *personnel* and supplied the *matériel* had given place to the effete system of the mandarins —a system which pervades the whole Chinese administration. The ships were undermanned, and the crews untrained. No supply of warlike stores existed, and in their fights with the Japanese the Chinese generally exhausted their ammunition. In these circumstances it may well be asked, Why was not the victory of the

Japanese at the Yalu more complete? The battle lasted nearly five hours, and in spite of their losses the bulk of the Chinese Fleet still presented some sort of a front to the enemy. The Japanese on their side had suffered some loss. The Flag-ship Matsushima was put out of action, and Admiral Ito had to transfer his flag to another ship. Admiral Ting's Fleet had lost the pick of its crews, and had exhausted its ammunition. From a tactical point of view, the success of the Japanese might for the moment have been disputed; from a strategical point of view, it was complete. Admiral Ito was absolute master of the Gulf of Petchili. The Chinese Fleet could no longer impede the movements of the transports nor the landing of the Mikado's troops. The first result of victory was the capture of Port Arthur. Winter, bringing with it the ice which bars the approaches to the Gulf of Petchili, alone protected Pekin from being attacked by the enemy.

Cause of Japanese success.

The Japanese gained the command of the sea because they knew how to thoroughly assimilate the methods of Western nations; because they had built up an efficient navy, manned by well-trained crews; and because they had not hesitated to make the sacrifices necessary to procure the best fighting *matériel*. Nevertheless, may we not say, without any reflection on their glory, that their successes were principally due to the ineptitude of their enemy; and that, if Admiral Ito had met an enemy worthy of himself, the result of the campaign would have been quite different? May we not also add that, if two European Fleets had fought for five hours, the losses on both sides would have been much greater; and that one of the Fleets would have been completely annihilated, while the other would have been seriously injured?

Value of armour.

Still, the battle of the Yalu gives us some interesting lessons. The first, and one which must be specially noted, is that armour is indispensable to withstand the attack of modern guns. In view of the fact that the Chinese ironclads Chen-Yuen and Ting-Yuen were hit more than 200 times each in the neighbourhood of the water-line, and that their vertical armour was not seriously penetrated, we may conclude that the protection afforded by armour is of real value; and it must be borne in mind that, though neither of the combatants used shells charged with high explosives, these ironclads were attacked by the most modern guns, whereas their most important protection consisted of compound plates dating from twelve years ago—plates, the resistance of which is very inferior to that of the hardened-steel armour which is now manufactured. Theoretically, the 34-cm. (13·3-in.) and 15-cm. (6-in.) guns of the Japanese ought to have perforated the Chinese armour when the

adversaries were at close quarters; but it is well known that in practice considerable deductions must be made from the results gained on the trial ground. The above conclusions as to the value of armour seem to be supported by what has taken place at Wei-hai-Wei. Another point strongly brought out by the battle of the Yalu is the great danger of fire from the explosions of shells, owing to the inflammable nature of the boats and wooden fittings. The Admiralties are everywhere much occupied with this great risk; and in all our war-ships it will be found that no wood will in future be used above the armoured deck in any portion of the structure or in the fittings.

Value of quick-firing guns.

It is useless to insist here on the service rendered to the Japanese by their fast ships and by their quick-firing guns. No one who has considered the subject has ever doubted the advantage of speed, provided that it is not obtained at an undue sacrifice of other qualities. In the same way the greatest rapidity of fire is one of the desiderata which must always be borne in mind, and which, moreover, it has always been sought to obtain, but quick-firing guns of moderate calibre cannot replace armour-piercing guns of large calibre. At the battle of the Yalu, a single 34-cm. (13·3-in.) projectile was sufficient to sink a Chinese cruiser, and a Chinese projectile of 305-mm. (12-in.) completely put out of action the protected coast defence ship Matsushima.

Principles of war-ship construction remain unchanged.

I am brought to the conclusion that the Chino-Japanese war does not in any way modify the principles which are accepted by the immense majority of sailors for the creation of a Navy. Though it affords them some illustrations on points of detail from which they will be able to draw profitable lessons, it will not contribute in the least to the revolution in warlike material which has been prophesied for so long and which has not come. I am convinced that we shall continue to build armour-clads, that we shall endeavour to improve their protection, and that this type of ship will always constitute the most important part of a Navy. We shall continue to discuss whether it is better to build large or small battleships, possibly whether it would not be wise to stop at armoured cruisers, and thus to combine high speeds with moderate protection; but the teaching of the battle of the Yalu, as well as of common sense, is clearly that protected cruisers ought not to be placed in the line of battle, for if the Japanese guns had hit in the region of the water-line, no matter which ship of the protected cruiser type, as often as they hit the two Chinese battleships, the cruisers would certainly have been sunk. It will be said, I admit, that the best ships of Admiral Ito belonged to the very class of ships which are called protected; but to this one may reply, that

the fire of the Chinese was very wild, and that it is impossible to draw the least lesson from their absolutely passive manœuvres.

In conclusion, it is made evident, from the events which have taken place in the Far East, that it is necessary to have good ships well commanded and manned by good crews, and that under such conditions the chances of a Naval battle may be honourably faced. This is no more than a time-honoured truism.

Brazilian Civil War.

While the defeat of the Chinese shows the important influence of the command of the sea on the fate of a people, the events of the Brazilian Civil War tend, on the contrary, to prove that a Navy can do no serious damage unless it rests on a good base of operations. The insurgent fleet was in possession of the bay of Rio, but as it only possessed most precarious means of supply, it was bound to abandon the contest sooner or later. This it did as a matter of fact, after having caused most useless damage. The last episode in the contest, the sinking of the battleship Aquidaban by the torpedo-boat Sempaio, is remarkable for the fact that, though the Sempaio was hit by thirty small projectiles fired from the Aquidaban, not only did she get safely out of the action, but not a single man of her crew and no important part of her machinery was hit. I must add that the Sempaio was unconscious of her victory ; she only heard of it next day from a German captain. Such an occurrence would seem to show that Naval warfare is full of surprises.

Naval programmes.

Turning from the warlike events of the year to the naval programmes of the principal Powers, it is apparent that in every country armour-clads are still being constructed and projected, that there is a marked tendency to increase the displacement of cruisers, that the principal Navies have all adopted the construction of very fast cruisers of large tonnage, and that a speed of 20 knots on active service is the minimum aimed at for this class of ship. For torpedo-boats or torpedo-boat destroyers we are rapidly approaching a speed of 30 knots. Engines have made some progress, but it is especially the boilers that have been improved. Multitubular evaporators with water-tubes are becoming of more and more general application, owing to the numerous advantages which they possess.

Armour is always being improved. The Harvey and Tressidder processes, which every Power uses to-day, are the latest improvements. The gun and the torpedo have made such brilliant advances during the last few years that only a few improvements in detail have been made in these weapons of destruction. Submarine navigation remains where it was. The difficulties which are met with at every step prevent it from ever passing beyond the region of experiment.

In concluding this general review, I should add that, although the programmes of the principal Navies have not been published at the time when I write, it is probable that the greater part will be content with the *status quo*, and will not greatly increase their Navy Estimates, not because there is no desire to increase their Navies, but because the economic crisis through which we are passing is in many cases an obstacle to the increase of expenditure. Some of the smaller Powers have drawn up programmes of reconstruction, but, unfortunately for them, their financial position will hardly permit them to put their programmes into execution. The maintenance of a navy, which is a necessity for some countries, a question of life and death for others, becomes an impossibility with the smaller states, whose finances have been badly administered, and this because the improvements in naval *matériel* are so frequent that a fleet can only be reckoned on which is frequently being renewed.

France.

Estimates for 1895.

For the first time in the eventful annals of France a Minister in office has been called upon to undertake the high functions of President of the Republic. M. Felix Faure, who was elected by the representatives of the people, was Minister of Marine. He drew up the Estimates of 1895, and, though these have not yet been voted, it is exceedingly improbable that they will be in any way modified. When he entered office M. Faure had to deal with sketch estimates, emanating from his predecessor, Admiral Lefebvre, estimates which had no chance of being accepted, because they increased the total expenditure, while they did not provide for laying down any fresh ships. In revising the estimates M. Faure effected certain reductions in the expenditure on administration, which is well known to be excessive in the French Navy, and on Reserves. The savings obtained thereby were carried to the vote for new construction. The estimates for 1895, a summary of which are given in their usual place in the volume, amount to 270,366,217 frs. (£10,814,648), an increase of 3,504,689 frs. (£140,185) on those of 1894. M. Faure's predecessor proposed estimates amounting to 277,516,311 frs. (£11,100,652). In fact, the Minister of Marine submitted two sets of estimates to Parliament in the same year. The increase of work and the confusion which must result from such revisions of the expenditure is very clear. If the French and English estimates are compared, it must not be forgotten that the French Navy Estimates are charged to the extent of £1,200,000 with the pay of Colonial troops; but,

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on the other hand, they are relieved from the pension charges. The Minister of Marine, it is true, is responsible for carrying on an institution which is called the "Caisse des Invalides," and which provides pensions for the men of the Mercantile Marine; but the funds of this institution are kept separate, and are composed partly of its own resources, partly of a subvention from the State.

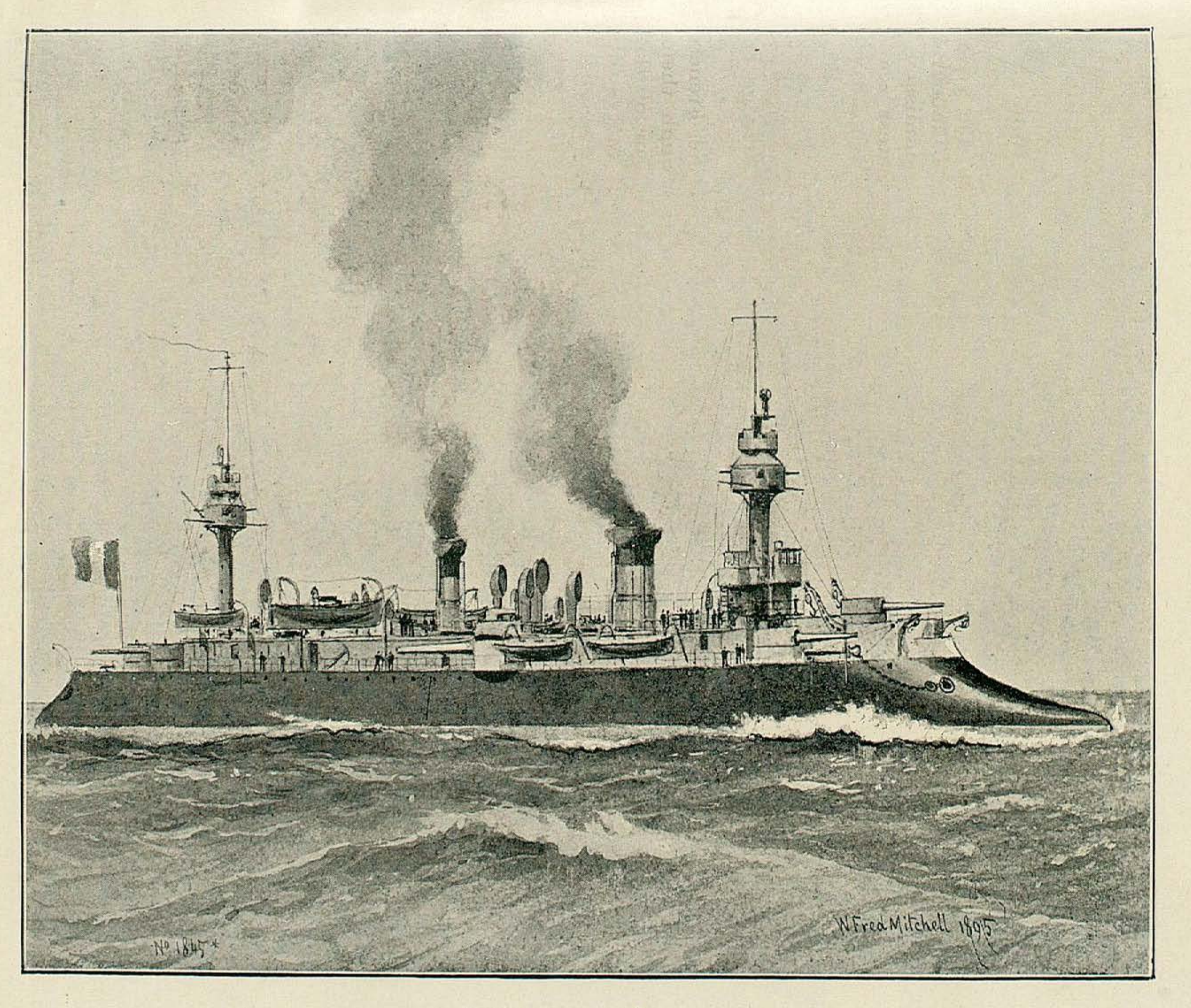
Commission on the Navy.

There is no event of great importance to chronicle in the year which has closed, with the exception, perhaps, of the labours of the important Commission on the Navy. This commission in the first instance sat very frequently, showed the greatest zeal, and visited several naval ports. Owing to Parliamentary holidays and Government crises, it has met very seldom lately; and at the present rate its inquiries will probably extend over several years. The deputies and senators who, with certain Admiralty officials, compose the Commission, have for the most part no knowledge of naval questions.

The general characteristic of the present position of the French Navy is the great number of vessels which are going through their trials rather than the number of ships completing afloat or on the stocks. In this regard it is well to notice the technical and quite temporary difficulties which have delayed the completion of ships which ought to have already been in commission in our Fleets. These difficulties relate to the use in active service of multitubular boilers of the Belleville, Collet, Lagrafelle, and d'Allest types, which had never hitherto been fitted in large ships of war, to which the stokers were unaccustomed, and which have in some cases rendered alterations necessary in the air-passages leading into the boiler-rooms.

Ships launched. Carnot.

The battleship Carnot was launched on July 12th. This ship was to have been called the Lazare-Carnot. The feeling which decided the Minister of Marine to adopt a name which would preserve the memory of both the great Carnot and his grandson, the assassinated President of the Republic, will be readily understood. The Carnot is being built at the Mourillon Yard, Toulon, from the designs of M. Saglio, Director of Naval Construction. Included with the Charles Martel and Jauréguiberry in the Budget Estimates of 1891, the Carnot was laid down in the first months of the year. Her principal dimensions are: Length, 380 ft.; beam, 70 ft. 6 in.; draught of water forward, 24 ft. 7 in.; aft, 27 ft. 3 in.; displacement, 11,988 tons. The triple expansion engines of the Carnot are to develop 6200 horse-power each and to drive twin screws. With natural draught they should give the vessel a speed of 17 knots,



"DUPUY-DE-LÔME,"

FRENCH ARMOURED CRUISER.

which will become 18 knots with forced draught. Steam will be furnished by 24 d'Allest boilers. The main armament is identical with that of the Charles Martel, and comprises two 30·5-cm. (12-in.) guns, forward and aft, and two 27-cm. (10·6-in.) guns on each beam. All are mounted in revolving turrets protected by 14·6 in. armour. The auxiliary armament consists of eight 14-cm. (5½-in.) quick-firing guns, mounted singly in 4-in. turrets; four 65-mm. and eight 47-mm. quick-firing guns and ten 37-mm. revolver-guns, two of which are in the upper tops. There are five torpedo-tubes. The larger guns have a commanding fire. Those on the broadside are at the same height above the water-line as the guns in the British barbette battleships, viz., 23 ft. The bow gun is 29 ft. 6 in. above the water.

The armour protection of the Carnot consists of a complete belt, which has this peculiarity as compared with preceding types, that it is not brought down to form a ram. The depth of the belt is about the same as that of the Brennus, 8 ft. 3 in.: its thickness varies from 10¾ to 17¾ in. The armoured deck has a thickness of 2¾ in.

The Carnot is like the Charles Martel, which is completing afloat at Brest, one of the last French battleships in which the principal armament is distributed in four turrets. The designs of later ships are based on the English system of mounting the big guns in pairs in two turrets. The Brennus, which preceded the two ships just mentioned, has this peculiarity, that while there are two 34-cm. guns mounted together in the fore turret, there is only one 34-cm. gun in the after turret.

Armoured cruiser Bruix.

The armoured cruiser Bruix, sister ship to the Latouche-Tréville, Charner, and Chanzy, which are either undergoing their trials or completing afloat, was launched at Rochefort on the 3rd August last. The principal characteristics are as follows:—Length over all, 374 ft. (length at water-line 348 ft.); beam, 46 ft.; mean draught, 19 ft. 2 in.; draught of water aft, 19 ft. 8 in.; displacement, 4745 tons; horse-power, natural draught, 7400, forced draught, 8300; corresponding speeds, 17 and 19 knots. Two vertical compound engines drive the screws. Steam is supplied by sixteen Belleville boilers in groups of four.

Protection is afforded by a complete water-line belt of 3⅝ inches maximum thickness; by a curved armoured deck 2 in. thick on the slopes and 1½ in. thick on the flat; and by a cofferdam extending to 4 ft. above the water-line. A splinter-proof deck, intended to stop the débris caused by shot and shell, is fitted over the engines and boilers.*

* *Cf.* also *Naval Annual*, 1893, p. 11.

The armament comprises two 19-cm. (7·5-in.) guns mounted at the bow and stern in revolving turrets, which are protected by 3⅝-in. plates; six 14-cm. (5½-in.) quick-firing guns mounted on sponsons on the broadside, and protected like the 19-cm. guns; four 65-mm., and six 47-mm. quick-firing guns, six 37-mm. revolver-guns, and five torpedo-launching tubes. Electrical machinery is fitted for loading and elevating the guns and training the turrets.

The four cruisers of the Latouche-Tréville type are fitted with two military masts, with three tops in each for the machine guns and electric light. In the forward part of the ship is a shelter for the captain, protected by 3⅝ in. of hardened steel. The completion of all these vessels has been delayed for the following reason. The technical staff of the Navy had compelled the adoption of a new system of artificial ventilation by driving compressed air into the funnels. This system has not given good results, and it has been found necessary to modify it. The ordinary ventilators have been reverted to, and in order to place these in convenient positions several internal modifications have had to be made.

Descartes. The cruiser Descartes was launched in September at Nantes from the yard of the Ateliers et Chantiers de la Loire. Her principal dimensions are as follows:—Length between perpendiculars, 316 ft.; extreme breadth, 42 ft. 4 in.; mean draught, 19 ft. 9 in.; displacement, 4000 tons. The armament consists entirely of quick-firing guns:—Four 16-cm. (6·2-in.), ten 10-cm. (3·9-in.), fourteen 47-mm., and eight 37-mm. The Descartes has four torpedo-launching tubes. She is fitted with twin screws, each driven by vertical triple-expansion engines, which are to develop together 8500 horse-power. The designed speed is 19 knots. The ordinary coal supply is sufficient for a distance of 6000 miles at 10 knots speed; with the reserve bunkers full this distance can be increased to 8000 miles. The sixteen boilers are of the Belleville type. The propelling machinery, the magazines and store rooms are below an armoured deck which extends from end to end of the ship, and is curved down to 4 ft. below the load water-line.

The Descartes is constructed entirely of steel. The hull is sheathed with teak and coppered, which will enable her to keep the sea for long periods without losing speed and without being docked. The contract for this cruiser was signed on the 29th August, 1892. The first keel-plate was laid at the end of January, 1893. She was to be handed over by the contractors in thirty-four months, and it appears certain that this period will not be exceeded.

Torpedo-gunboat Cassini. The Cassini has been built at Havre by the Forges et Chantiers de la Méditerranée. Her principal characteristics may be com-

pared with those of the Halcyon class, the most recent English torpedo-gunboats.

	Cassini.	Halcyon.
Length	262 ft. 6 in.	250 ft.
Beam	27 ft. 3 in.	30 ft. 6 in.
Draught of water aft . . .	11 ft. 6 in.	(mean) 9 ft.
Displacement	945 tons.	1070 tons
Horse power	5000	3500
Maximum speed (estd.) . .	21 knots	19 knots
Armament	1 18-cm. (7-in.) Q.F., 3 65-mm., and 4 37-mm. Q.F.	2 4·7-in., and 4 6-pr. Q.F.
Torpedo-tubes	2	5

The propelling machinery of the Cassini consists of two compound vertical three-cylinder engines, which are to make 266 revolutions a minute.

According to the Estimates the following vessels should have completed their trials in 1894, viz.: the first-class battleship Brennus; the coast-defence battleships Valmy and Bouvines; the armoured cruisers Chanzy and Charner; the second-class cruisers Friant and Chasseloup-Laubat; the third-class cruiser Linois; the gunboat Surprise, and the torpedo-gunboat Cassini. The majority of these ships are not yet ready for sea. Steam Trials in 1894.

The most important of them, the Brennus, is undergoing costly alterations. One of the military masts is being removed. The hull above the upper deck is being, so to speak, cleared, and the superstructure is being demolished. This superstructure was added whilst she was building; but it must not be imagined that it resembles that of the Magenta, of which so much has been said, and which is also to be considerably reduced. In the case of the Magenta, a huge steel deck-house for the boats was erected above the upper deck to protect them from the blast of the big guns. On the Brennus the deck obstructions and the boats were in no danger, and the steel supports of the superstructure were only added for the purpose of raising the boats at sea, and of disencumbering the deck. By the alterations which are being made the top-weight will be reduced, and the stability of the ship will be increased. Alterations to Brennus;

The Friant has had her military masts and the 47-mm. quick-firers, with which they were armed, removed with the view of augmenting her stability. Four of her torpedo-tubes have also been removed. to Friant.

Of the ships mentioned above, the Friant, Chasseloup-Laubat, and Cassini alone are not behindhand. The year 1895 has therefore inherited many of the steam trials which belonged to 1894. According to the forecast of the Admiralty the following vessels were to go through their trials in 1895, which we give in the order in which they Steam Trials in 1895.

were to take place :—Armoured cruisers Dupuy de Lôme and Bruix ; second-class cruiser Descartes ; torpedo-gunboat Casabianca ; coast-defence battleship Tréhouart ; first-class battleship Jauréguiberry ; second-class cruiser Bugeaud ; submarine boat Morse ; torpedo depôt ship Foudre. The trials of several of these ships will certainly be postponed till 1896, for although the French Navy has made considerable progress in the last few years, it has not yet discovered the way in which to complete ships in the time estimated. It is only fair to point out that having been the first to adopt, for large vessels, the boilers of which the Belleville is the prototype, new regulations for ventilating the boiler rooms, and for stoking the new furnaces, had to be drawn up, and that it has been necessary to adopt certain slight modifications which have delayed the final trials. Moreover, in France machinery is only accepted after long and severe trials, and after putting the ships to a variety of tests, which are not all very useful.

The following ships have completed their trials :—

Trials completed. Coetlogon. The Coetlogon, third-class cruiser of 1850 tons, which has been so much discussed, has been accepted. She attained the mean speed of 20·6 knots.

Jemmapes. The coast-defence battleship Jemmapes, sister ship to Valmy (in commission at Brest for the first time), has already been described. It will be remembered that she is one of a group of four ships which were originally to have been built on the same design—that of a modified Furieux. The Jemmapes and Valmy have remained low free-board ships, while the Bouvines and the Tréhouart have been raised at the bow, and have been given more beam. The former are armed with two 34-cm. (13·4-in.), the two latter with two 30-cm. (11·8-in.) guns. The Jemmapes has two horizontal three-cylinder engines, each driving one screw. Steam is supplied by three groups of boilers of the Lagrafelle and d'Allest types, which were designed to develop 8400 horse-power with forced draught, a power which has been considerably exceeded. The following are the results of the trials :—

	Reduced Speed Natural Draught.	Normal Power Natural Draught.	Maximum Power Forced Draught.
Indicated horse-power	2219	7760	9201·3
Pressure in the boilers	12k·597	14k·181	14k·33
Heating surface, in sq. ft.	10,861	21,624	21,624
Number of fires lighted	8	16	16
Grate surface, in sq. ft.	323	646	646
Coal burned per sq. ft. of grate, in lbs. .	110¼	237	325
Coal burned per horse-power per hour, in lbs.	1·354	1·8037	2·0771

The mean speed realised during the full power trial was 16·7 knots.

d'Iberville The torpedo gunboat d'Iberville, built, as was the Jemmapes, at St. Nazaire, has been commissioned for active service. This ship was designed according to a legend submitted to competition by the

Minister of Marine. Its principal conditions included a considerable armament, protection by hardened steel over the greater part of the ship's length, speed of 21·5 knots, with a consumption not exceeding 160 kilos (353 lb.) of coal per sq. metre ($10\frac{3}{4}$ sq. ft.) of grate, a normal coal supply equivalent to a distance of 4500 miles at 10 knots, which could be increased to 6000 miles with full bunkers, and, finally, a displacement not exceeding 950 tons. The problem was a most delicate one. No foreign ship of a similar type, such as the Italian Partenope or the Chilian Almirante Condell (built in England), having exceeded a speed of 20·3 knots. A weight of only 550 tons was available for the unprotected hull and the propelling machinery, and to overcome the difficulty the most suitable lines had to be combined with the most careful scantlings and the very best quality of material, both for the hull and the machinery. The design of the Société de la Loire, which was accepted by the Minister of Marine, embodied the following principal particulars :—Length between perpendiculars, 262 ft. 6 in. ; beam at water-line, 26 ft. 3 in. ; depth of hold amidships, 17 ft. 5 in. ; mean draught of water, with all stores on board, 10 ft. 4 in. ; corresponding displacement, 925 tons. There are two tandem triple expansion engines, with four cylinders and two propellers. Diameter of cylinders, h.p. 22 in., m.p. 34 in., l.p. $36\frac{1}{4}$ in. ; length of stroke, 19 in. Propellers, diameter, 6 ft. 6 in. ; pitch, 8 ft. 8 in. Number of revolutions per minute, 290. Horse-power, 5000. Four boilers of the Lagrafelle-d'Allest type, with a grate surface 339 sq. ft., and heating surface, 11,354 sq. ft.

The following are the results of the trials of the d'Iberville :—

Date.	Duration of trial.	Indicated horse-power.	Revolutions.	Mean Speed on measured mile.	Consumption of Coal per horse-power.
16 June . . .	6 hrs.	1·800	207·6	15·82	0·647
29 June . . .	18 ,,	3·313	258	19·3	0·838
30 June . . .	6 ,,	4·400	280	20·7	
27 July . . .	4 h. 16 m.	5·060	292·3	21·61	0·980

The torpedo-cruiser Fleurus, of 1310 tons displacement and 18 knots speed, has been fitted with a new arrangement in her boilers which has not given good results. This arrangement has been abandoned, but the alterations necessitated by the change have so strained the boilers that it has been decided to change them. **Fleurus.**

As we have said already, the Brennus should have completed her trials; but her alterations will now take several months, and she cannot be commissioned before the summer. It is apparent from this summary that the list of ships completed during the past year is very small.

Before passing on to new construction, it is well to say a word about the submarine boat Gustave-Zédé. This small vessel has an **Gustave Zédé.**

electric motor driven by accumulators, and it has been necessary to overcome serious difficulties before the apparatus was completely under control. After experiments, which caused the loss of much precious time, the trials of the Gustave-Zédé have been resumed. She has not only managed to descend to a depth of 40 ft. below the surface, but she has also discharged her torpedoes in a most satisfactory manner. The trials are being continued.

New construction, 1894.

Very few ships were laid down in 1894. The battleships Charlemagne and St. Louis, both of 11,200 tons displacement and 14,500 horse-power, of which a description was given in the *Naval Annual* of 1894, have been commenced at Brest and Lorient respectively. Twelve stern-wheel light draught gunboats have been built for the Madagascar Expedition. They are a reproduction of Yarrow's well-known type.

Programme for 1895.

The shipbuilding programme for 1895 has not yet been taken in hand. It includes the battleship " A " (now named Gaulois), which will be an exact reproduction of the Charlemagne and St. Louis. She will cost £1,100,534, and is to be completed in 1899.

The general characteristics of two first-class cruisers, for which contractors have been requested to furnish designs, are as follows:—Displacement, 8500 to 9000 tons; engines of about 26,000 horse-power; triple screws; speed, 23 knots; to burn 150 kilos (331 lbs.) of coal per square metre ($10\frac{3}{4}$ sq. ft.) of grate; multitubular boilers; armoured deck, in polygon form. A light belt 20-mm. ($\frac{3}{4}$-in.) in thickness at the water-line, covering the cofferdam. Armament, two 16-cm. (6·3-in.), six 14-cm. (5·5-in.), and ten 47-mm. quick-fire guns. No torpedo-launching tubes. The radius of action is fixed at 7500 miles at 12 knots. The price is to be about £720,000. The ships to be rigged like mail steamers.

The private yards will also build (1) a 2nd-class cruiser of the same type as the Catinat, which was described at page 29 of the *Naval Annual* of 1894. The new cruiser will be sheathed with wood and coppered. (2) Two 3rd-class cruisers of 2100 tons, the designs of which are not yet completed. They are to have a speed of 17 knots with forced draught, and to be armed with four 14-cm. (5·5-in.), five 65-mm., and several 37-mm. quick-firing guns. They are intended for foreign stations. (3) A station gunboat is to be laid down, of which we can give some particulars. Length, 223 ft. displacement, 1243 tons; maximum horse-power, 2200; speed, 15 knots; coal supply, 199 tons. Armament, one 138-mm. (4·7-in.), five 10-cm. (3·9-in.), and seven 37-mm. quick-fire guns. Cost, £96,287.

Two sea-going torpedo-boats, five 1st-class torpedo-boats, and five torpedo-boats for carrying on board ship, may be included with the ships shortly to be built.

The vessels to be laid down in 1895 are thus 19 in number, which will bring up to 85 the number of vessels of all sorts on the stocks, completing afloat, or going through their trials, viz. :—

Class.	Name.	Laid down.	Probable date of completion.
Battleships, 1st Class	Brennus	1889	1895
" "	Carnot and Charles Martel	1891	1896 (end)
" "	Jauréguiberry	1891	1896
" "	Bouvet (may be launched 1895)	1893	1897 (end)
" "	Masséna	1892	1897
" "	Charlemagne	1894	1898 (end)
" "	St. Louis	1894	1898 (end)
" "	A. (Gaulois)	1895	1899
" 2nd Class or Coast Defence	Bouvines	1890	1895
" "	Tréhouart (complete but for few fittings)	1890	1895
" "	Valmy	1890	1895
Cruisers (Armoured)	Dupuy de Lôme	1888	1895
" "	Bruix	1891	1895
" "	Charner	1889	1895
" "	Chanzy	1890	1895
" "	Latouche-Tréville (on trials)	1890	1895
" "	Pothuau	1893	1896
" 1st Class	D'Entrecasteaux	1893	1897 (end)?
" "	Two (8500–9000 tons)	Pro.	
" 2nd Class	Chasseloup-Laubat (on preliminary trials)	1891	1895
" "	Friant (first trials completed)	1891	1895
" "	Bugeaud	1892	1895 (end)
" "	Descartes	1893	1896
" "	Pascal (progressing rapidly)	1893	1897
" "	Du Chayla	1894	1897
" "	D'Assas	1894	1897
" "	Cassard	1894	1897
" "	Catinat	1894	1897
" "	E 4 (Catinat type)	1895	1899
" 3rd Class	Galilée	1893	1896
" "	Linois (on trials)	1892	1895
" "	Lavoisier	1894	1897
" "	Two (2100 tons)	Pro.	
Torpedo Cruiser	Fleurus	1891	1895
Torpedo Gunboats	Cassini and Casabianca	1893	1895
Torpedo Depôt Ship	Foudre	1892	1896
Station Gunboat	Raymond	1894	1897
Aviso Transport	Vaucluse (construction suspended)	1894	1898
Gunboat	Surprise	1894	1895
Seagoing Torpedo-Boats	5	..	1895
" "	1	..	1896
" "	1	..	1897
1st Class "	26		
3rd Class "	8		
Submarine Boat	1		

No information is at present available with regard to the Programme of 1896. The main features of the next Budget have as yet hardly been discussed, owing to the late ministerial crises and the delay in voting the Estimates for the current year.

Germany.

Last year the Reichstag reduced the votes which were demanded for new construction, and only authorised the commencement of one battleship to replace the Preussen, while refusing to vote the sums necessary to replace the Leipzig and Falke. In his wish to convince the representatives of the Empire of the necessity of considerably increasing the German Navy, the Emperor William made to several of their number a speech containing a most interesting review of the composition and value of different navies, and of the lessons to be drawn from the naval battle of the Yalu.

Programme for 1895.

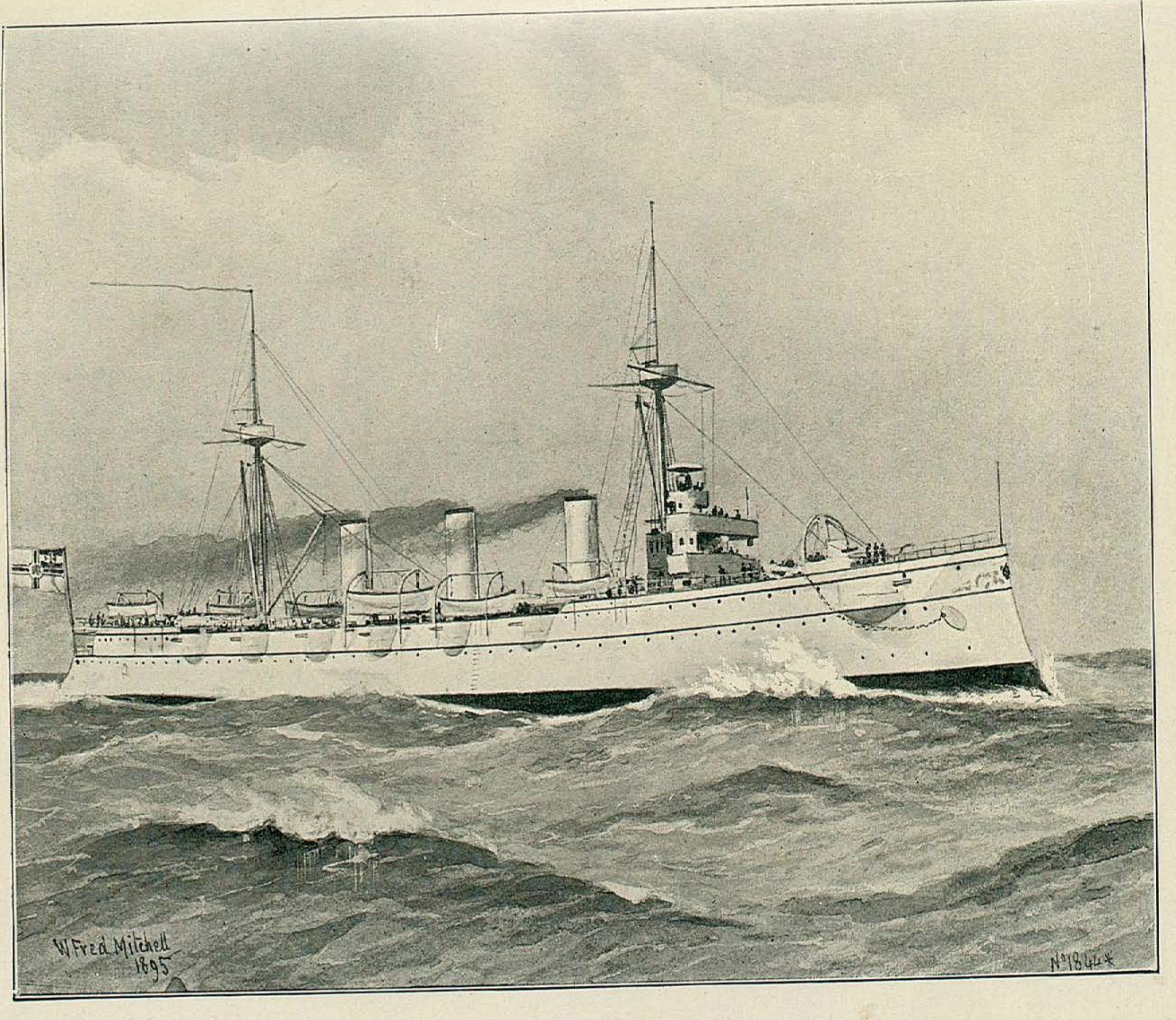
In the estimates for 1895–6 the following new construction is proposed * :—One first-class battleship to replace the Preussen; one first-class cruiser of 7500 to 9000 tons, with an armoured belt and deck, to replace the Leipzig; three 2nd-class protected cruisers, K, L, and another, to replace the Freya, of a modified Gefion type; one torpedo division boat of 140 to 150 tons; and eight 1st-class torpedo-boats. A large amount of work is to be taken in hand on the König Wilhelm, Friedrich der Grosse, and Deutschland.

Ships launched. Odin V and T.

The fourth-class battleships, Odin V and T, have been launched, the first from the Imperial yard at Kiel, the second from the Imperial yard at Dantzig. They are the seventh and eighth of the series, which includes the Siegfried, Beowulf, Frithjof, Heimdal, Hildebrand, and Hagen. The ironclads of this class were originally designed as coast-defence ships, and were more expressly destined for the protection of the North Sea and Baltic Canal; but they have proved more suited for service as small battleships than for coast-defence work. The eight ships resemble one another very closely, though the later ones embody certain improvements. For instance, those of more recent construction have nickel-steel armour, and the Odin has water-tube instead of cylindrical boilers. All are remarkable for the very small amount of wood that has been employed in their construction.

These little ironclads are 240 ft. long, 49 ft. 3 in. broad, and draw 17 ft. 9 in. of water at a displacement of 3500 tons. The engines,

* The votes for the cruisers have been passed, that for the torpedo division boat has been refused.—Ed., March 1.



"KAISERIN AUGUSTA,"

GERMAN PROTECTED CRUISER.

driving twin-screws, are of 4300 horse-power, and give a speed of 16 knots. The protection consists of a complete belt 7 ft. 6 in. in depth and 9·4 in. thick, of two covered barbettes of 8-in. steel, of a 1·37-in. steel deck, and of steel shields for the secondary guns. Armament: two 9·4-in. long Krupp guns in the forward barbette; one similar gun in the aft barbette; six 3·4-in. quick-firers, and four torpedo-ejectors.

Geier.

The 3rd-class cruiser Geier (F.) has been launched at Wilhelmshaven. Length, 246 ft.; beam, 33 ft. 6 in.; mean draught, 15 ft.; displacement, 1640 tons; horse-power, 2800; speed, 16 knots. The hull is of steel and wood. Armament: eight 3·96-in. quick-firers, four machine-guns, and two torpedo-ejectors.

Ships laid down.

The new ironclad, which is to take the place of the obsolete Preussen, has been commenced. She is a reproduction of the Worth, with slight modifications. Armament: four 11-in. guns of 40 calibres; two 11-in. guns of 35 calibres; six 3·96-in. quick-firers of 30 calibres; eight 3·4-in. quick-firers of 30 calibres; two 2·3-in. boat guns, and eight 3·1-in. machine-guns. Extreme speed: 17·2 knots with forced draught, 111 revolutions, and 10,230 horse-power.

Trials. Battleships.

The following ships have completed their trials:—

The Worth, with 111 revolutions, steamed 17·2 knots in 30 fathoms of water; her speed being reduced to 16·7 knots in 20 fathoms and 16·6 in 10 fathoms. This reduction in speed shows how necessary it is to try ships in deep water. The Worth was displacing 10,040 tons and had a mean draught of 24 ft. 7 in., her designed load draught. The Weissemburg in her trials attained a speed of 17 knots. The Brandenburg, sister ship to the preceding, has been through her trials again since the terrible accident which sacrificed so many lives. She steamed 16·5 knots with forced draught.

Gefion.

The Gefion, a cruiser of 4108 tons and 9000 horse-power, has been through her preliminary trials.

Komet. Hagen.

The torpedo-gunboat Komet, of 946 tons and 5000 horse-power, steamed 23 knots. The 4th-class battleship Hagen has commenced her trials.

One torpedo division boat and eight 144-ft. torpedo-boats of 26 knots speed have been ordered from Schichan. Eight torpedo-boats have been handed over to the Government. When all the torpedo-boats in course of construction have been completed Germany will possess a flotilla of 11 torpedo division boats of from 250 to 380 tons, and 110 1st-class torpedo-boats.

The Navy Estimates proposed by the Government amount to £4,319,525 for 1895–6.

Italy.

The financial position of Italy has compelled her to reduce her Navy estimates. According to the proposals of Signor Crispi's Cabinet they are fixed at £3,713,000 for the year 1895–96.

Admiral Morin, Minister of Marine, is making vigorous efforts to reduce the general expenses and the *personnel* which he considers superfluous. The officers' lists have been reduced by two vice-admirals, two rear-admirals, and two post-captains. On the other hand, he has increased the lists by one commander, seven commanders of corvettes, and thirty-seven coastguards. Admiral Morin has fought an heroic battle against Naples with regard to the proposal to close the arsenal at this beautiful town and to transfer it to Taranto. Every local interest was combined against the Minister, and every influence was brought into play to put a stop to his proposal.

Ships launched.

The following ships have been launched:—

Calabria.

The protected cruiser Calabria, built at Spezzia, is a sister ship of the Liguria, which has lately been through her trials. Her dimensions are as follows:—Length, 297 ft. 4 in.; beam, 42 ft.; draught of water, 16 ft. 7 in.; displacement, 2470 tons; horse-power, 4000 with natural draught, 6500 with forced draught; estimated speed, 19 knots. The armament comprises four 15-cm. (6-in.), six 12-cm. (4·7-in.), one 75-mm., eight 57-mm., and eight 37-mm. quick-fire guns. There are two torpedo-launching tubes. The Calabria is protected by an armour-deck and a cofferdam.

Caprera.

The torpedo-gunboat Caprera (ex Clio), of a slightly modified Iride type, has been launched at Leghorn. Length, 230 ft.; beam, 27 ft. 4 in.; depth of hold, 18 ft.; mean draught of water, 10 ft. 2 in.; displacement, 853 tons. She has an armoured deck 1 in. in thickness. Two vertical engines are intended to develop 4000 horse-power. Estimated speed, 21 knots. The armament comprises two 12-cm., four 57-mm., two 37-mm. quick-fire guns and five torpedo-launching tubes.

Governolo.

The gunboat Governolo, which has been launched at Venice, is intended for service on foreign stations. Length, 185 ft.; beam, 33 ft. 9 in.; mean draught of water, 13 ft. 9 in.; displacement, 1255 tons; speed, 12 to 13 knots. Armament, four 12-cm., four 57-mm. and four smaller quick-fire guns.

Sardegna.

Amongst the ships going through their trials, the armour-clad Sardegna first demands our attention. She is practically sister ship to the Re Umberto, which is already in commission, and of which an

illustration was given in the *Naval Annual* of last year, and of the Sicilia, now completing at Venice. The Sardegna was laid down in 1884, and was launched in 1890. Her principal dimensions are :—Length, 411 ft. ; beam, 76 ft. 9 in. ; mean draught of water, 28 ft. 6 in. ; displacement, 14,210 tons.* The protection consists of an armour belt extending over nearly two-thirds of the length, and ending in two transverse bulkheads, as in the British battleships. This belt is only 4 in. thick. At either end of the armoured redoubt are the barbettes which contain the main armament. They are protected by compound-armour 14¼-in. in thickness. The turtle-backed armoured deck sloping down at either end of the ship is 3-in. thick on the slopes. Between the barbettes on the upper deck is an unarmoured battery.

The Sardegna has a most powerful armament, which consists of four 34-cm. (13·4-in.) guns, and eight 15-cm. (6-in.), sixteen 12-cm. (4·7-in.), ten 57-mm., and seventeen 37-mm. quick-firers. There are five torpedo-launching tubes. With this armament and her high speed, the Sardegna certainly possesses great offensive power, but her defensive qualities do not reach even the minimum necessary for a battleship. In fact, the Sardegna is an armoured cruiser, superior to other ships of this class in speed and armament, but too costly and too large for the part which she seems to be fitted to play in naval warfare.

The propelling machinery of the Sardegna consists of four triple-expansion three-cylinder engines coupled two on each shaft. Steam is supplied by eighteen cylindrical return-tube boilers, disposed in three groups of six boilers each. One of these groups is abaft, the two others forward of the engines. This arrangement is most sensible, for it allows more working space around the engines, and it diminishes the chance of the engines being disabled by an injury to the steam pipe. The total weight of the machinery and boilers is 2022 tons, that of the coal carried 1200 tons.

Trials.

The contract provided for 15,200 horse-power with natural draught, and 22,800 horse-power with forced draught, the maximum number of revolutions being 112. According to the *Rivista Maritima,* in a preliminary natural draught trial the Sardegna made 18·97 knots with 92 revolutions and 13,169 horse-power. At the official natural-draught trial of three hours' duration she attained a mean speed of 19·06 knots with 94·8 revolutions and 14,190 horse-power. It should be remarked that the vessel was not down to her load draught and only displaced 13,950 tons. The forced draught trial took place on the 12th July, the Sardegna then displacing 13,505 tons, and

* With reserve bunkers full, normal displacement is 13,860 tons.

drawing 28 ft. of water. All the furnaces were lighted and all the fans in use. Pressure in the boilers, 142 lbs.; number of revolutions, 100. The trial only lasted two hours, during which the machinery developed 16,220 horse-power, and a speed of 19·64 knots was obtained. Various breakdowns appear to have interrupted the trial, but no information is forthcoming as to their nature.

Marco Polo.

The armoured cruiser Marco Polo has also been through her trials. The principal dimensions are: Length, 327 ft.; beam, 46 ft. 6 in.; draught of water, 19 ft. 6 in.; displacement, 4590 tons. Protection is afforded by a belt, and by a central redoubt of 4-in. armour, and by an armoured deck. The horse-power with natural draught is 6000; with forced draught, 10,000.

Umbria.

The protected cruiser Umbria has been commissioned. She belongs to a well-known type described in the *Naval Annual* of last year. The following table gives the results of the trials of the Umbria and other ships of the same class:—

Name.	Tonnage	Mean draught of water on trial.	Natural Draught.				Forced Draught.			
			Pressure.	Revolution.	Horse-power.	Speed. Knots.	Pressure.	Revolution.	Horse-power.	Speed. Knots.
		ft. in.	lbs.				lbs.			
Lombardia .	2380	15 7	140	116	2610	15	140	149	6010	18·4
Liguria . .	2250	14 11	143	127	3444	15·9	142	145·4	5536	18·1
Etruria . .	2280	15 2	143	126	4602	16·9	152	142	7019	18·8
Umbria . .	2283	15 10	138	127	4910	17·7	148	140	7400	18·9

£912,000, or £22,000 less than in 1894–5, is to be devoted to new construction. The following ships, some of which are on the stocks, and some completing afloat, are to be advanced: the battleships Admiral Saint Bon at Venice and Emmanuele Filiberto at Castellamare; the cruisers Calabria at Spezzia, Vettor Pisani (which may be launched during the spring) at Castellamare, Giuseppe Garibaldi at Sestri Ponente, and Varese at Leghorn; and the gunboat Governolo at Venice. The estimates also provide for the construction of several torpedo-boats and torpedo-boat destroyers. It has been reported in the Italian naval newspapers that Admiral Morin has approved the designs of two battleships of quite novel design and of very low freeboard, designs which originated with Signor Brin, formerly Minister of Marine and of Foreign Affairs, who is a distinguished naval architect. It is, however, clear that no new construction will be taken in hand, and that all the resources of the Italian Navy will be concentrated on the ships already laid down or completing afloat.

Russia.

The Russian Navy Estimates for 1895 amount to £6,102,612, or rather less than the Estimates for 1894, which amounted to £6,125,488. Of the former sum £2,120,600 are allotted to new construction.

Several ships have been launched during the past year. **Ships launched.**

The battleships Petropauloski and Poltava, of 10,900 tons displacement, 10,600 horse-power, and 17 knots speed, have been launched at St. Petersburg. They are sister ships to the Sevastopol, which is in course of construction at Nicolaieff, and will probably be launched in the autumn. Their armament comprises four 12-in. guns, which are mounted in two barbettes, protected by 10-in. Harveyed steel; eight 8-in. guns in 5-in. armoured casemates; twenty-four smaller guns and six torpedo tubes. These ships have a water-line belt of which the maximum thickness is 15¾ inches, and a 3½ in. armoured deck. The total weight of the armour is 2848 tons. **Petropauloski and Poltava.**

The Cizoi Veliky was launched in the spring. A sister ship, the Rostislav, is on the stocks at Nicolaieff, and a third vessel of the same type is to be laid down in the Baltic. The following are the principal dimensions:—Length over all, 348 ft.; length on water line, 341 ft.; beam, 66 ft. 6 in.; draught of water aft, 24 ft.; displacement, 8880 tons. Protection is afforded by a belt 17·7 in.* in thickness and 7 ft. in depth, extending over 247 ft. of the length. Above this belt is a redoubt 195 ft. long, protected by 5 inches of steel. There is another redoubt on the upper deck shorter than the one below, but also protected by 5 inches of armour. Transverse armoured bulkheads, 5 inches in thickness, close in the ends of the redoubts. The armoured deck is 3 in. thick. The centre is 2 ft. above, the sides nearly 5 ft. below the water-line. There are two turrets, one forward and one aft, each being protected by 17·7 inches of armour, and armed with two 12-in. guns of 40 calibres of the Oboukhoff type. The auxiliary armament includes six 15-cm. (6-in.) Canet (mounted in the upper redoubt), and eighteen smaller quick-firers. There are six torpedo tubes. The engines are intended to develop 8500 horse-power, steam being supplied by twelve Belleville boilers placed in three separate compartments. The ordinary coal supply will be 550 tons, which will suffice for 5000 miles at 10 knots. The estimated speed is 16 knots. **Cizoi Veliky.**

The battleship Rostislav, a slightly modified Cizoi Veliky, has been laid down at Nicolaieff. The armament will comprise four **Rostislav.**

* 15·7 in. is more probably the thickness of Cizoi Veliky's armour.—Ed.

10-in. guns, and eight 6-in. quick-firers, compared with four 12-in. guns, and six 6-in. quick-firers in the Cizoi Veliky. She is to be fitted with furnaces for burning the petroleum oils of the Black Sea.

Standard. The cruiser-yacht Standard, of 5557 tons and 23 knots speed, building for the Emperor at Copenhagen, has been launched. She will be fitted to carry guns in case of war, and will be manned by sailors of the Imperial Guard. She will be completed early in 1896, and is to cost £284,620.

General Admiral Apraxin. The coast defence ship General Admiral Apraxin, which has been commenced at the New Baltic Works, at St. Petersburg, is of the same type as the Oushakoff and Senjavin, of 4120 tons displacement, and sixteen knots speed. The former was practically completed last autumn, but not in time for her trials; the latter was launched in August.

Otvazny. The gun-boat Otvazny, of 1500 tons, built at St. Petersburg, has completed her trials. With a pressure of 150 lbs., and 164 revolutions, she developed 2589 horse-power, and steamed 15·5 knots instead of the 15 knots estimated.

Rurik. The large cruiser Rurik was practically finished last autumn, but her trials will not take place till the spring. She will probably be attached to the Russian Mediterranean Squadron.

Rossia. The enlarged Rurik (of 12,130 tons), now known as the Rossia, has not as yet been much advanced. The armament consists of four 8-in. guns, mounted in sponsons forward and aft; six 4·7-in. quick-firers on the upper deck on the broadside; sixteen 6-in. quick-firing guns on the main deck in the battery, and thirty-six smaller quick-firers distributed in the tops and on the upper works. The Rossia has five torpedo-tubes and carries four torpedo-boats. Protection is afforded by a belt at the water-line, extending over three-fourths of the length, and an armoured deck. The engines will drive three screws and are to develop 15,000 horse-power. The estimated speed is 20 knots, and with the centre screw alone the Rossia is to steam 9 knots. 2,500 tons of coal can be carried, which will enable her to steam from Cronstadt to Vladivostock without stopping. Her complement will be 700 men and 35 officers.

The third large cruiser of the Rurik type, which was talked of last year, has not yet been laid down. It is however expected that a cruiser of about 9000 tons will shortly be laid down at St. Petersburg.

A small transport for the White Sea is being built at the Thames Iron Works. Length, 246 ft.; beam, 32 ft.; draught of water, 18 ft. A torpedo-boat destroyer of the Havock type is being built by

Messrs. Yarrow. The Admiral Korniloff is being re-boilered at the Baltic works.

Volunteer Fleet.

The Petersburg, the third ship of the same class built for the Russian Volunteer Fleet by Messrs. Hawthorn, Leslie, and Co.,* during a continuous run of more than twelve hours, maintained a speed of 19 knots. The ship displaces more than 9000 tons, is 460 ft. long, and 52 ft. in beam, with engines of 11,000 horse-power. She is steel-built, with a cellular bottom and several water-tight compartments, and will accommodate 1500 troops. Two other ships are being built for the Volunteer Fleet by Messrs. Denny.

Ships completing.

Of the other ships under construction not already mentioned, the battleships Navarin and Georghy Pobyodonosets (George the Victorious) should be finished this summer, and the Three Saints, which has gone to Sevastopol to be completed, will be ready for her trials in the autumn. The Gangoot was finished last year.

Some very remarkable trials have taken place at Ochta, near St. Petersburg, with Holtzer projectiles of peculiar construction, the secret of which has been carefully guarded up to now. They have a power of penetration far superior to that of ordinary shells, though it must be said that the experiments on the Creusot trial ground have given results which may be compared with those of Ochta.

The Governor of Sevastopol has hitherto been a general. The fortress has now been placed under an admiral, who also has charge of the defence of the coast. The dockyard of Sevastopol increases in importance daily. The construction of the new docks is being actively pushed forward, and it is reported that two battleships and three small cruisers are shortly to be commenced there for the Black Sea Fleet.

Austria-Hungary.

The armoured cruiser Kaiserin und Königin Maria Teresa, which was briefly described last year, has been through her trials. Her displacement is 5270 tons. With forced draught her engines were intended to develop 10,000 horse-power, and her estimated speed was 19 knots. On her trials under natural draught she steamed 17·13 knots, with 5880 horse-power; and on her forced draught trial she steamed 19·35 knots, with 9755 horse-power. The following additional particulars as to the distribution of her armament will be of interest:—There are two barbettes and a central citadel protected by 4-in. armour, the ends of the citadel being also closed in by 4-in.

* Messrs. Hawthorn are also building two vessels for the Black Sea Co.

athwartship bulkheads rising from the armoured deck. The armament consists of two 24-cm. (9·4-in.) Krupp 35 calibre guns mounted, one in each barbette, and worked by electricity; eight 15-cm. (5·8-in.) Krupp guns, of which four are sponsoned out at either end of the citadel and the other four mounted on the deck above, protected by 3·9-in. shields, and so placed that they can be trained either ahead or astern or on each broadside; two 7-pounder Uchatius guns for the boats, eighteen 47-mm. (3-pounder) quick-firing guns, two machine guns, and four torpedo tubes. The ship will be lighted by electricity, and will carry 740 tons of coal.

Six first-class torpedo-boats have been ordered.

Some experiments in armour have taken place at Witkowitz, in consequence of which the factory of this name has received orders for nickel-steel plates. Admiral Baron von Sternck, the head of the Navy, told the Delegations that Austria-Hungary was now in a position to dispense with foreign assistance for all naval material and stores except coal.

The budget of 1895 amounts to £1,298,126, an increase of £50,358 on that of 1894. In the shipbuilding vote are included sums for the six torpedo-boats mentioned above, for the coast defence battleships A, B, and C, which are on the stocks, and for completing the Maria Teresa.

Coast defence ships.

The coast defence ships A, B, and C are of the following dimensions:—Length, 305 ft.; beam, 55 ft. 9 inches; mean draught of water, 21 ft.; displacement, 5550 tons; horse-power, 8500 tons; estimated speed, 17·25 knots. These ships are protected by an armoured belt 10·6 inches in thickness, and by two bulkheads of 7·9-in. armour. The conning tower is protected by armour of the same thickness. There is a 2·4-in. armoured deck. All the armour is of Witkowitz steel. The armament will include four 24-cm. (9·4-in.) guns, mounted in pairs in barbettes protected by 9-in. armour. Six 15-cm. (6-in.) and fourteen 47-mm. quick-firing guns and one machine gun. These vessels will be fitted with two military masts. One is being built at Pola and the other at Trieste.

Denmark.

The third-class cruiser Heimdal, sister-ship to the Hekla and Geiser, was launched at Copenhagen on August 31st. Length, 257 ft. 6 in.; beam, 27 ft. 6 in.; mean draught of water, 11 ft. 4 in.; displacement, 1280 tons. The engines will develop 3000 horse-power. Speed, 17·5 knots. The Heimdal is built of steel with

double bottom, and protected by an armoured deck 1½ in. thick. The armament comprises two 12-cm. (4·7 in.) and four 3-pr. quick-fire guns, six machine guns and four torpedo-tubes.

Successful experiments have been made at Copenhagen with a new torpedo-net cutter.

The Navy estimates for 1895–6, which amount in all to £386,770, include a sum of £60,000 for the small armour-clad, Skjöld, of 2150 tons, which is on the stocks, for the purchase of a first-class torpedo-boat, and for laying down another small armour-clad.

Holland.

The Piet Hein, which belongs to the new programme of the Netherlands Fleet, has been launched from the Fijenoord yard. Length, 283 ft.; beam, 47 ft.; mean draught of water, 16 ft. 9 in.; displacement, 3400 tons. The hull is built of steel, and is protected by a complete 6-in. belt at the water line, and by an armoured deck 2½ in. in thickness. The armament comprises two 21-cm. (8¼ in.) guns, mounted in a pear-shaped barbette forward, protected by 9·5 inches of steel, one 21-cm. gun aft, one 15-cm. gun in a sponson on each broadside, six 75-mm. (3 in.), and six 37-mm. quick-firing guns, two torpedo-launching tubes. The horse-power is 4800, and the speed 16 knots. Two sister-ships of the Piet Hein, the Evertsen and Kortenaer, are still on the stocks.

The estimates for 1894–5 for the Home Navy amounted to £1,561,935, the budget for the Indian Navy to £791,671. The *personnel* of the latter, distributed in 25 different vessels, numbers 3794 men, of whom 1011 are natives.

Three cruisers are to be laid down, which are intended to replace three very old ships. Their principal characteristics are as follows: Length between perpendiculars, 306 ft.; beam, 48 ft. 6 in.; mean draught of water, with 400 tons of coal on board, 17 ft. 8 in., and with 800 tons of coal, 19 ft. 2 in. The displacement is 3900 tons, and the cost of each vessel £285,700. These cruisers will be built of steel. They will have twin screws, an armoured deck and cellular sub-division. The engines and boilers will be protected by the coal bunkers. The armament consists of two 6-in. quick-fire guns forward and aft, six 4·7-in. quick-fire guns on the broadside, four 57-mm. and eight 37-mm. quick-fire guns, and four torpedo-launching tubes. They are to steam 20 knots at their normal draught of water. Their coal endurance at 10 knots, with 400 tons of coal, is 3200 miles. **Cruisers.**

Norway.

Two torpedo boats, the Varg and Raket, have been launched at Christiania. Length, 113 ft. 2 in.; beam, 12 ft. 1 in.; displacement, 43 tons. One is to be fitted with Thornycroft and the other with Du Temple boilers.

Tenders have been invited in England for the torpedo gunboat, for the construction of which a subscription was raised amongst the ladies of Christiania.

Portugal.

The Portuguese Government proposes to build a new fleet, the ships of war which Portugal at present possesses being completely out of date. With this object a rather curious arrangement is to be made. The Government wishes to come to terms with a company which should not only undertake to build the ships, but also to establish a dockyard, with the necessary plant, at Lisbon. This company would receive an annual payment of £111,000 for twenty years, and it would have a monopoly of the ship-building and repairing work in Portugal, the Azores, Cape de Verde Islands, and in Angola. It does not seem that the Cabinet of Lisbon has as yet been overwhelmed with offers for putting this project into execution.

The proposed programme is said to include two small armour-clads of the type of the Argentine Independencia, viz., of 2300 tons displacement, 3000 horse-power, and 14 knots speed; two cruisers of the Nueve de Julio type, of 3500 tons displacement, 14,000 horse-power, and 22 knots speed; two other cruisers of 2600 tons and 20 knots speed; four others of 1300 tons and 13 knots; three Hornets; twelve first-class torpedo-boats, and a transport of 5000 tons and 16 knots speed.

The only order given by Portugal is for two river gun-boats for the Zambesi to Messrs. Yarrow.

Spain.

The Viscaya, sister ship to the Infanta Maria Theresa, and built like her at Bilbao, has completed her official trials. She is a first-class cruiser, of 7000 tons displacement, and is armed with two 28-cm. (11-in.) guns, ten 14-cm. (5·5-in.) Hontoria quick-fire guns, two Nordenfelts of 97 mm., and several smaller quick-fire guns.

Her armour-plates are of Sheffield manufacture, and of 12 inches in thickness. In the eight hours' natural draught run 9500 horse-power was obtained, and the speed was 18 knots. On the four-hours' forced draught trial the horse-power exceeded 13,000, and the speed was a fraction over 21 knots, as compared with 13,722 horse-power and 20·24 knots in the case of the Infanta Maria Theresa. The Almirante Oquendo, another ship of the same type, will be ready for her trials shortly.

The armoured cruiser Carlos V. was launched at Cadiz on the 12th March, the principal dimensions are: length, 380 ft.; breadth, 67 ft.; displacement, 9089 English tons; with 18,500 H.P., she is to steam 20 knots.*

Sweden.

The Swedish Government is asking for a vote of £599,800 to build three small battleships, one gun-vessel, ten first-class, six second-class torpedo-boats, and one torpedo depôt ship. It was proposed that the ships should be finished in five years. It is doubtful whether Parliament will accept the views of the Government.

An armour-clad of the Svea type, to be named the Oden, has been laid down. Length, 270 ft. 4 in.; beam, 47 ft. 10 in.; mean draught of water, 16 ft. 6 in.; displacement, 3400 tons; horse-power, 3700; and speed, 16 knots. The armament includes two 25-cm. (9·8 in.) guns, which are mounted forward and aft in turrets protected by 12-inch armour. Between the turrets on the upper deck is a 5-inch armoured redoubt, in which are placed four 12-cm. and six 57-mm. quick-firers. Four 37-mm. quick-firers, two machine guns in the tops, and a torpedo tube complete the armament. The partial armoured belt is 12 inches and the armoured deck 2 inches in thickness.

Two torpedo-boats, the Gondul and Gudur, have been completed. The former steamed 19·2 knots, the latter 19·94 knots on the trials.

Turkey.

In spite of the reconstruction of certain ships, the Turkish Navy is in the same hopeless state to which we have alluded in previous years. During the past year six vessels of but little military value have been launched on the Golden Horn, viz., the sloops Sed-ul-Bahr and Zuhaf (displacement, 800 tons; speed, 12·7 knots; armament, four 4·7-in. and six Hotchkiss guns and two torpedo-tubes), the

* The Reina Regente has been lost with all hands.

gunboats Seyd-i-Darah and Shefket Numa (of 200 tons), and two smaller boats, the Rehber and the Ahter.

The Germania yard at Kiel has delivered a torpedo division boat of 250 tons, built on the model of the German boats. A torpedo-gunboat, of 850 tons displacement and 21 knots speed, will be completed at the same yard.

United States.

Congress has been asked to sanction the laying down of three battleships of 10,000 tons each, to cost £800,000, and twelve torpedo-boats of 100 to 300 tons.

Amongst the most important bills which have been before Congress is that which reorganizes and fixes for the future the officers' lists. It is well known that in the United States promotion is very slow in the lower grades, that officers reach the higher ranks at a very advanced age, which causes discontent amongst the officers and conduces to inefficiency. The Bill in question fixes the numbers in the various ranks as follows:—Ten rear-admirals, sixty captains, one hundred commanders, seventy-four lieutenant commanders, two hundred and fifty lieutenants, seventy-five junior lieutenants, cadets in sufficient numbers to supply the wastage in the higher ranks. It is hoped that the Bill will pass during the present Session.

Castine and Machias.

The two gunboats Castine and Machias, which were wanting in stability, have been cut in two amidships and lengthened 14 ft. Their displacement is thus increased from 1050 to 1220 tons, and their length from 190 to 204 ft. The metacentric height is increased from 9 in. to 19 in., and thus adds greatly to their stability. The additional length gives them increased bunker space, which will enable them to carry 85 additional tons of coal on the same draught and increase their radius of action by about 750 miles, while burning 14 tons a day.

Second class cruisers.

In the case of the second-class cruisers Detroit, Montgomery, and Marblehead, of 2000 tons, 5-in. quick-firers have been substituted for the 6-in. quick-firers, in consequence of the want of stability these ships displayed. All these ships are now in commission, and the Secretary of the U.S. Navy quotes the report of the commanding officer of the Detroit as to the satisfactory behaviour of that vessel.

Gun-vessels.

The gun-vessels building, Nos. 7, 8, and 9, have been named Albatross, Penguin, and Porpoise. The Penguin and Porpoise are 250 ft. 9 in. long, 39 ft. 6 in. broad, and displace 1392 tons on a mean draught of 9 ft. Indicated horse-power, 1600; speed, 13 knots.

Armament, eight 4-in. guns, four 6-pounders, two 1-pounders, two machine guns. The Albatross has the same armament, but she is fitted with a torpedo-tube. Her dimensions are different. Length, 220 ft.; beam, 39 ft.; mean draught, 11 ft.; displacement, 1371 tons indicated horse-power, 1790; speed, 14 knots.

Three torpedo-boats, modified Ericcsons, having a displacement of 135 tons, are in course of construction.

The United States Committee of Naval Construction has recommended for adoption a submarine boat according to the designs of Mr. J. P. Holland. This boat is of the usual cigar shape, 90 ft. long, and 10 ft. 10 in. greatest diameter. She is capable of descending to a depth of 70 ft., and when submerged, her storage batteries will drive her motor at a rate which will give her a speed of eight knots for a period of 16 hours, her surface speed being 16 knots. Submersion is secured by the admission of water.

Trials of Maine.

The official trial of the armoured cruiser Maine took place on October 17th, 1894. It was of four hours' duration, and was a trial of machinery alone, the hull having been built by the Government and the machinery by the Quintard Iron Works, New York. The contract required 9000 I.H.P. The Maine is 318 ft. long on the water line, 57 ft. broad, and displaces 6682 tons on a mean draught of 21 ft. 6 in. Her first trial was made at a mean draught of 18 ft. 6 in., the displacement being 5500 tons. Her engines are vertical. Steam pressure in boilers, 144 lbs.; revolutions per minute: starboard, 129·96; port, 122·31; air pressure in inches of water, 1·97; indicated horse-power, all machinery in operation, 9292. No attempt was made to accurately measure the speed, but the patent log showed a mean of 17·45 knots for the four hours. In another trial at her load displacement the speed was 16·99 knots.

Trials of Minneapolis.

The steam trials of the cruiser Minneapolis, which came off on the 14th of July, have earned Messrs. Cramp, of Philadelphia, her builders, a bonus of £83,000,* in addition to her contract price, which was £338,000, as she attained a speed of 23·073 knots, with 20,366 horse-power, in place of the estimated speed of 21 knots.

The Minneapolis is one of the few cruisers that are provided with triple screw propellers, among the others being the Columbia, the French Dupuy de Lôme, and the German Kaiserin Augusta. The new French battleships are also fitted with triple screws. The Minneapolis was launched on August 12, 1893. She is 412 ft. long and 58 ft. broad, and of 7475 tons displacement. She is known as a

* It is reported that the bonus system is to be abandoned in the United States.

"Commerce-Destroyer" or "Pirate." Her heavy armament consists of one 8-in. gun, two 6-in. and eight 4-in. quick-firers. She has in addition twelve 6-pdrs., four 1-pdrs., four Gatling guns, and five torpedo-ejectors. She is protected by a sloping armoured deck, 4-in. thick at the sides, and has a double bottom, minutely sub-divided into water-tight compartments. The engines and machinery are also protected by patent fuel, which will be packed around them to the thickness of 5 ft. Using her centre screw only the Minneapolis can steam 10 knots with a very economical expenditure of coal. Of this she can carry no less than 2400 tons, and is able to steam 19,000 miles without re-coaling. The tactical diameter of the Minneapolis is approximately 800 yards, and the ship turns through 16 points in 2 minutes 50 seconds, and within five or six times her length.

Olympia.

The protected cruiser Olympia is also a valuable addition to the American Navy. Her principal dimensions are: Length over all, 344·16 ft.; length on load water line, 340 ft.; beam, 53 ft.; normal mean draught, 21 ft. 6 in.; displacement, 5800 tons. She is constructed throughout of steel, a double bottom being worked the length of the machinery and boiler spaces. A complete protective deck is worked 2 inches thick on the flat throughout, $4\frac{3}{4}$ inches on the slopes amidships, and 3 inches on the slopes forward and aft. The upper edges of the armour-deck beams at the sides are 4 ft. 6 in. below, and at the centre line are generally 1 ft. above the load line, but at the ends the deck tapers down to the side line of the beams. A cofferdam, 2 ft. 9 in. thick, is worked above the protective deck, completely around the ship. It extends to a height of 4 ft. above the load water line. The space immediately above the protective deck is closely sub-divided, and much of it is filled with coal, thus forming an additional safeguard against the effect of damage in the neighbourhood of the water line. The vessel has three complete decks, including the protective deck and a large superstructure amidships. She has two masts, with a fighting-top and electric-top in each, and carries fore and aft sail.

The battery of the Olympia consists of four 8-in. guns, ten 5-in., fourteen 6-pounder, and six 1-pounder quick-firers, four Gatlings, and six torpedo-tubes. The 8-in. guns are mounted on the main deck, forward and aft, in elevated barbettes 4 in. thick, with equivalent conical turrets around the guns. The armoured ammunition tube is partly conical and partly straight, being 3 in. thick throughout. The 5-in. guns are mounted on the superstructure in such a way that four of them can fire directly ahead, four astern, and five on either beam. They are protected by

4-in. segmental shields. The secondary battery of quick-firing guns is distributed all over the ship, and has 2-in. protection. There is one fixed torpedo-tube in the bow, one in the stern, and two training tubes on each broadside. The 8-in. guns are 26 ft. and the 5-in. guns 18 ft. above the water line.

The vessel has a complete electric plant of the most modern type. Her full complement is 466 men.

The propelling machinery of the Olympia consists of two independent sets of vertical inverted direct-acting triple-expansion engines, driving twin screws. The cylinders are 42 in., 99 in., and 92 in. in diameter respectively, with a stroke of 42 in. The results of a four hours' forced-draught speed test showed that the vessel is capable of steaming 21·69 knots per hour with 17,363 indicated horse-power (including auxiliaries), and 143 revolutions per minute.

The total cost of the Olympia is estimated at about £477,600. She has been built by the Union Iron Works of San Francisco.

Indiana. Oregon.

The battleship Indiana has also been through her trials. She was built by Cramp, of Philadelphia, and was launched February 25th, 1893. Length between perpendiculars, 348 ft.; extreme breadth, 69 ft. 3 in.; mean draught of water, 24 ft.; displacement, 10,231 tons. The disposition of her powerful armament has been described in previous numbers of the *Annual*. On the preliminary trials, with natural draught she steamed 15 knots, with forced draught she steamed 15·6 knots; the contract speed is 16 knots, and everything points to the conclusion that this speed will be attained on the official trial. On a preliminary trial, the Oregon, sister ship to the Indiana, steamed 17·5 knots with 9500 horse-power. The Oregon, Indiana, and Massachusetts are to be completed in 1895.

Argentine Republic.

Patria.

The torpedo cruiser Patria of 1183 tons has been through her trials. "She is," says the *Engineer*, "a cruiser similar to the Halcyon and Harrier class, but, on the recommendation of Messrs. Laird, the Argentine Government decided to have the poop and forecastle joined, forming a complete spar deck, which adds much to the general comfort and seaworthiness, makes it possible to place the broadside guns fully 7 ft. higher above water, and affords accommodation available for the carrying of troops or reliefs when required, whilst the larger engine-power gives a knot per hour greater speed. The principal dimensions are: Length, 250 ft.; beam, 31 ft. 6 in.; draught of water, with armament and all normal weights on board, 10 ft. The screws do

not project below the line of keel. She has bunker capacity for 250 tons of coal, or 4000 knots range of action.

"The machinery consists of two sets of tri-compound engines. The main condensers, evaporators, and distillers are of brass, and the auxiliary machinery and general arrangements are similar to the builders' well-known type of high-speed engine, of which the Rattlesnake was the original. The boilers are four in number, of the dry bottom locomotive type, worked on the closed stokehold system, the air-pressure for full power not exceeding 2½ in. Each pair of boilers and each set of engines are in separate compartments.

"The armament is of the best and newest type. The guns are two 4·7-in., of Armstrong's make, the four 8-pounders and two 3-pounders being Maxim-Nordenfelt, carried on the spar deck, and two 1-in. machine-guns on the bridge; whilst the torpedo equipment consists of one bow tube and four broadside tubes carried on the main deck, worked through specially designed ports, the torpedoes being made by Whitehead, of Fiume, of the latest 18-in. pattern."

Under natural draught, over the measured mile on the Clyde, with 190 revolutions, the speed was 17·72 knots. The full power forced-draught trial of three hours' duration was run the 31st August, 1894, when a mean speed of 20·75 knots with 233·5 revolutions per minute was attained, exceeding by a knot the guaranteed speed.

A cruiser is being built at Elswick which is expected to be the fastest cruiser in the world—speed, 23½ knots. Her dimensions are: length, 396 ft.; beam, 47 ft. 2 in.; mean draught of water, 18 ft.; displacement, 4500 tons. Her armament comprises two 8-in. 45-calibre guns, ten 4·7-in., sixteen 3-pdr. and six 1-pdr. quick-firing guns. The armoured deck varies from 5 in. to 1½ in. in thickness. She is fitted with five torpedo tubes. Her engines are by Messrs. Humphrys, Tennant & Co. With 17,000 horse-power, her contract speed is 22·75 knots. She is now being sheathed with wood, and will be ready for launching in about three months. She can carry 1000 tons of coal in her bunkers.

CHILI.

Trials of Blanco Encalada.

The cruiser Blanco Encalada has undergone her trials. This vessel is of the type of fast cruiser to which the Elswick Works has paid so much attention. She has been built from the designs of Mr. Philip Watts. Length, 370 ft.; beam, 46 ft. 6 in.; mean draught, 18 ft. 6 in.; displacement, 4500 tons. She was described in the *Naval Annual* of

1894. The trials of the vessel, which have been carried out under the superintendence of a commission of Chilian officers, together with Sir E. J. Reed, M.P., the technical adviser to the Chilian Government, were begun on May 22, 1894, with the testing of the guns and torpedoes, which proved highly successful. The armament consists of two 8-in. guns, one mounted forward and the other aft, as bow and stern chasers, and ten 6-in. quick-firing guns mounted on sponsons, the two foremost and the two aftermost of which can fire in line of keel. The vessel can, therefore, direct one 8-in. and two 6-in. guns ahead or astern, and two 8-in. and five 6-in. on any point within 50 degrees either side of the beam. The 8-in. guns are of 40 calibres length, and have an initial velocity of 2260 ft. Four rounds with the 8-in. guns were fired in 62 seconds. The weight of the projectile is 210 lbs. The trials of the propelling machinery, which is by Messrs. Humphrys, Tennant & Co., under natural draught, took place on the 23rd, and were continued for twelve consecutive hours, the mean of six runs over the measured mile giving a speed of 21·79 knots, with about 11,000 I.H.P. The forced draught trials were completed in the next week, the mean speed on the mile, with and against the tide, being 22·78 knots, or a quarter of a knot in excess of that guaranteed by the firm, the horse-power realised during the runs being about 14,500 indicated. The manœuvring qualities of the ship were thoroughly tested, the results in all cases giving great satisfaction.

The cruiser Esmeralda has been sold to Japan through the agency of the Republic of Ecuador.

Brazil.

New Programme.

The Brazilian Government is negotiating for the construction of two small battleships, three cruisers, and two torpedo-cruisers. The battleships are to be built in France by the Forges et Chantiers de la Mediterranée, and the torpedo-cruisers in Germany. The three cruisers have been ordered from Elswick, but their design is not yet settled. The principal particulars of the battleships are:—Length, 267 ft. 6 in.; beam, 47 ft.; draught of water, 13 ft. 2 in.; displacement, 3162 tons; horse-power, 3400; speed, 14 knots. They will be armed with four 9·4-in. guns mounted in turrets forward and aft, two 6-in. rifled howitzers, four 4·7-in., two 12-pounder, and six smaller quick-firers. Want of money is said to be delaying the commencement of these vessels.

Sinking of Aquidaban.

We have already mentioned the sinking of the Aquidaban, of

which the following are the complete details :—The attack took place between 11 o'clock and midnight. The battleship was moored in St. Catherine's Bay, close to the beach, and in little more than her own draught of water. She was supported by infantry on shore The attack was led by the sea-going torpedo-boat Gustavo Sempaio, supported by another torpedo-boat. The Sempaio is fitted with a bow tube, two broadside tubes, and two quick-firers. The torpedo-boat advanced first and fired her bow torpedo at 100 yds. and her broadside tube at 75 yds. Both missed. The Sempaio then advanced, and at 75 yds. fired her bow torpedo, which missed, and at 50 yds. her port broadside torpedo, which struck the Aquidaban on the port bow between the sixth and seventh frames, the injuries extending from the bow to the twelfth frame and below the protective deck, which was apparently uninjured. All bilge frames on this side were crushed inward ; the water-tight bulkheads at the sixth frame were entirely carried away, as were other frames aft to the water-tight bulkhead at the twelfth frame, which was uninjured and door closed. The two forward compartments only were flooded. On the starboard side, two feet above the keel and near the seventh frame, was a hole about two feet in diameter, the ragged edges of which were flanged outward and aft, showing the direction of the missile to have been broad off the port bow. The hole was presumably made by the head of the torpedo being blown completely through the ship in its original direction. The frames, longitudinals, and plating, in the near vicinity of the explosion, were much twisted, but the remainder of the hull was in a good condition, apparently uninjured by the explosion. When the vessel was abandoned by her crew after the torpedo attack, they evidently attempted to disable her battery. All the guns were found to be more or less injured, except the 70-pounder in the stern. She is said to have made the trip from Santa Catherina to Rio de Janeiro with her two forward compartments full of water. On the arrival at this place, her name was changed to the 24 de Maio. The Gustavo Sempaio was hit forty times by projectiles or *débris* of projectiles without receiving any serious damage. The 24 de Maio has been temporarily patched up at Rio. She is to come to France to be thoroughly refitted like the Riachuelo. The latter has been overhauled at La Seyne.

Japan.

The Japanese Navy has rendered during the past year the greatest services to its country, for it was the Navy that opened the road to the victorious arms of the Land of the Rising Sun ; and it was not

only the Navy that proved capable of carrying out its *rôle.* The Mercantile Marine, requisitioned for the transport of troops and of the immense quantity of material they required, rendered incalculable service.

Some months before the opening of hostilities the Government of the Mikado ordered in England two large battleships, one, the Fujiyama,* from the Thames Iron Works, the other from Elswick. She was designed by Mr. G. C. Mackrow, the Naval Architect of the Thames Iron Works, in accordance with the views of a commission presided over by Captain Yendo, the Japanese Naval Attaché in London. The following are the principal elements of her design:—Length between perpendiculars, 374 ft.; breadth, 73 ft.; draught of water, 26 ft. 6 in.; displacement, 12,450 tons; coal capacity at above draught, 700 tons; total coal capacity, 1100 tons. New battle-ships.

Armament: Four 12-in. guns, mounted in pairs in two barbettes plated with 14-in. armour; ten 6-in. quick-firers in casemates; twenty 3-pounder and four 2½-pounder Hotchkiss quick-firing guns; five torpedo ejectors, one above and four below the water.

The armour belt is 226 ft. long, 18 in. thick abreast of machinery and boiler spaces, 16 in. thick at the ends. The armour deck extending from stem to stern is 2½ in. thick, and terminates in a powerful ram. The decks are to be of teak. There are two military masts with double tops, with derricks for lifting the boats. Thirteen boats are carried, including two 56 ft. vedette torpedo-boats. There are five search-lights.

The triple expansion engines, of 14,000 horse-power, are being constructed by Humphrys, Tennant and Co., of Deptford, the boilers being of the usual cylindrical type with Humphrys' ferrules. Speed, 18 knots. Each ship carries about 3000 tons of Harveyed plates, which have been contracted for by Messrs. Cammell and Co. and Messrs. Vickers, of Sheffield. The armament for both ships is supplied by Elswick.

A protected cruiser was laid down at the Yokosoka navy-yard in May, 1894. She is a sister ship in essential features to a cruiser laid down at the same yard in March, 1893. Length, 306 ft. 9 in.; beam, 40 ft.; displacement, 2700 tons. Armament, two 6-in. and six 4·7-in. Armstrong quick-firers and twelve 3-pounders. A steel deck runs from stem to stern, 2 in. thick on the slopes and 1 in. on the flat. Triple expansion engines of 8000 I.H.P. drive twin screws, which are to give a speed of 20 knots. New cruiser.

A despatch vessel authorised in 1893 was also laid down at Kuré, the Japanese government yard. Length, 304 ft. 6 in.; draught,

* It is doubtful whether this ship has been yet named.—Ed.

13 ft.; displacement, 1800 tons. Engines of 6000 I.H.P. Armament, eight 4·7-in. quick-firers, four 3-pounders and two torpedo-tubes.

The steel torpedo-vessel Tatsuta, of 875 tons and 21 knots speed, launched in April, 1894, by Armstrong, Mitchell and Co., was completed in August, 1894. She is detained at Aden. A description of this vessel was given in the *Naval Annual* of 1894.

SAINT DOMINGO.

Independencia.

A small vessel has been built in England, 170 ft. long and 25 ft. broad, which displaces 322 tons. She is armed with seven Hotchkiss quick-firing guns. She reached her destination in January.

E. WEYL.

CHAPTER III.

Relative Strength.

It is desirable to review each year, in the pages of the *Naval Annual*, our position as a naval power as compared with that of other countries. It has been accepted by both political parties in the State that the standard of strength for the British Navy is an equality, if not superiority, to the Navies of any two foreign Powers. In the debates on the introduction of the Naval Defence Act, and on the motion of Lord George Hamilton for the increase of the Navy, in December, 1893, prominent Members on both sides of the House of Commons expressed their adherence to this view. Owing principally to the fact that the French Navy is the Navy next in importance to our own, and partly also to the fact that it is only with France and Russia that we have any points at issue which are in the least likely to lead to serious difference, it has been usual to compare the strength of the British Navy with those of France and Russia combined. This is the course it is proposed to adopt in the present instance.

Ships in Commission. European waters.

We will deal first with ships in commission. It has been urged by certain writers in the Press—notably by Mr. Laird Clowes in the September number of the *Nineteenth Century*—that we must regularly maintain in the Mediterranean a naval force stronger than any foreign naval force in those waters. During recent years it has been the policy of the French to concentrate by far the greater part of their naval forces in the Mediterranean. The dockyard facilities are insufficient at the present moment to admit of our adopting the policy alluded to above—a policy which, "while it would add nothing to our effective strength in case of war, would certainly be calculated to excite emulation in naval preparations." Even if ample dockyard accommodation existed, it is open to question whether it would be desirable to largely add to the Mediterranean Fleet. The Channel Fleet may be fairly taken into account in a comparison, which includes the Toulon Reserve Squadron. A true estimate of our relative strength in European waters can only be arrived at by including in the comparison all ships in commission, whether in the Mediterranean, Channel, or Reserve Squadrons.

GREAT BRITAIN.				FRANCE. (From *Le Yacht*, February 23rd.)		
	Mediterranean Fleet.	Channel Fleet.	Reserve Squadron (reduced crews).	Mediterranean Fleet. Permanent Squadron	Mediterranean Fleet. Reserve Squadron.	Northern Squadron. (in full commission four months only).
Battleships . .	Anson Barfleur Camperdown Collingwood Hood Howe Nile Ramillies Rodney Trafalgar (10)	Empress of India Repulse Resolution Royal Sovereign (4)	*Coast Guard*— Alexandra Benbow Colossus Edinburgh *Port Guard*— Devastation Inflexible Rupert Thunderer *Tenders*— Conqueror Hero (10)	Amiral Baudin Courbet Dévastation Formidable Magenta Marceau Neptune (7)	Amiral Duperré Caiman Indomptable Richelieu Terrible (5) Achéron † (Toulon)	Furieux Requin Suffren Victorieuse (4) Flamme † (Dunkirque)
Cruisers, 1st Class or Armoured . .	Hawke	Blenheim Endymion	Australia Aurora * Galatea Warspite	Tage	Sfax	Latouche Tréville
Cruisers, 2nd Class .	Arethusa Cambrian Sybille		Mersey Melampus	Suchet	..	Jean Bart
Cruisers, 3rd Class or Look-out Ships .	Barham Scout Surprise Fearless	Bellona	..	Condor Cosmao Faucon Lalande Troude	Forbin Milan Vautour Wattignies	Coetlogon Epervier Surcouf
Torpedo-Gunboats .	Dryad, Gleaner, Hebe, Skipjack. In reserve, Sandfly	Sharpshooter, Speedy.	Jason, Leda, Niger, Onyx, Salamander, Sheldrake, Seagull, Spider.	Bombe, Leger, d'Iberville.	Couleuvrine, Flèche, Lévrier.	Lance, Salve.
Torpedo-Ram . .	Polyphemus					
Torpedo Depot Ship .	Vulcan					
Sloops . . .	2					
Seagoing Torpedo-Boats . . .	3	..	..	5	2	3

* To be replaced by Dreadnought. † Armoured gunboats.

It is worth while to compare the strength of the above squadrons at the commencement of 1895 with the strength at the beginning of the year 1893 (as given at page 70 of the *Naval Annual* for the latter year). In the British squadron, four battleships, now classed as second-class, viz., the Colossus, Dreadnought, Edinburgh, and Inflexible, the ill-fated Victoria, and her sister-ship the Sans Pareil, have been replaced by three of the Admiral class, and three of our most modern ships, the Ramillies, the Hood, and the Barfleur. Two new first-class cruisers of 20 knots speed have replaced the Australia and Undaunted; two modern second-class cruisers have been added to the Fleet. There are four torpedo-gunboats in the Fleet instead of one. The French permanent squadron now includes only seven first-class battleships, instead of nine in 1893. The reserve squadron includes only five battleships instead of eight. Four of these are of the second class, and three are classed by the French as coast-defence ships. The cruiser strength of both French squadrons has diminished. The Vauban and the Duguesclin no longer belong even to the reserve squadron, and the new armoured cruiser Dupuy de Lôme has never yet been on active service. It is obvious from this brief review that we are far stronger in the Mediterranean, relatively to the French, than we were two years ago. Though the force that we keep permanently in those waters might not be able to cope with the French combined active and reserve squadrons, in the Channel Fleet we have a force which should properly be regarded as the reserve squadron for the Mediterranean. It is not needed for the protection of the Channel, as we shall show in a moment; and though at times it may be further from the important strategic point than the French reserve squadron, it is, on the other hand, always in full commission. Mediterranean squadron.

The Channel Fleet has been reinforced by a battleship and a torpedo-gunboat since 1893. It now includes four of the most powerful battleships afloat, all of the Royal Sovereign class, and two first-class cruisers.

The French combined Mediterranean squadrons now include twelve battleships, four being of the second class. It is possible that the active squadron may be strengthened by the Brennus, which is now undergoing extensive alterations, before the close of the present year. In the combined Mediterranean and Channel Fleets we have fourteen battleships of the first class, six of which are individually more powerful than any ship which the French have at present in commission.

The French Escadre du Nord, according to the new arrangements, will only be kept in full commission for four months, and for the remainder of the year will be placed in the first category of the Escadre du Nord.

reserve. Half of the squadron used to be in commission for the whole year, the other half for six months only. It now consists of four ships instead of six, viz.: two coast-defence and one third-class battleships, and one armoured cruiser of the oldest type. Before the end of the current year it is proposed that the Hoche, first-class battleship, should replace the Suffren, and the second-class battleship Bouvines the Victorieuse, and the Jemmapes the Furieux. The Dupuy de Lôme, Fleurus, and possibly other cruisers are to be added to the squadron, which by the addition of these modern ships will be considerably strengthened.

Coast-Guard and Port-Guard ships.

On the other hand, we have in partial commission in home waters one first-class, seven second-class,* and two third-class battleships, and four armoured and two second-class cruisers, as compared with three second-class and six third-class battleships, three armoured cruisers, and two coast-defence ships two years ago. Our strength in home waters is overwhelming.

Russia.

What is the strength of Russia in European waters? The battleship Nicolas I., to be replaced in the summer by the Navarin and some smaller vessels, are in commission in the Mediterranean. The Vladimir Monomach has sailed for Siberia. Her place will possibly be taken in the autumn by the Rurik. The following ships were commissioned for the summer manœuvres; they are not in commission all the year round:—

RUSSIA.

Black Sea.		Baltic.	
Battleships	Catherine II. Sinope Tchesmé Dvenadsat Apostoloff	Battleships	Alexander II. Peter the Great
		Armoured Cruiser	Dimitri Donskoi
2nd Class Cruiser	Pamyat Mercuria	Coast-Defence Ships	Lazareff Tchitchagoff Smertsch
Torpedo-Gunboats	2		
		Armoured Gunboats	Gremiatschy Otvazny

Russia has only four other battleships (viz., the Nicolas I., George the Victorious, Navarin, and Gangoot) and six armoured cruisers completed, besides those mobilised for the manœuvres. The present strength of the Russian Navy is not such as to cause us serious anxiety. The number of ships kept permanently in

* It is reported that the Sans Pareil (first-class battleship) will relieve the Thunderer on her return from the Mediterranean.

commission are very few. In any comparison in which the whole available strength of the Russian Navy is included (it can only be available at certain seasons of the year) it would be proper to include British ships in the Fleet Reserve.

Fleet Reserve.

The Fleet Reserve consists of ships ready for sea within forty-eight hours. The ships are kept filled up with coal and with all non-perishable stores on board, except ammunition. It is probable that, with few exceptions, they would be ready for sea within the time stated. We have at present in the Fleet Reserve two first-class, five second-class, and seven third-class battleships, eight armoured cruisers, besides three first-class, over twenty second-class, and five third-class cruisers of modern types. With the exception of four second-class battleships (besides those in the Mediterranean Reserve Squadron) all available French battleships are in commission.

A general survey of the strength of the British, French, and Russian Navies in European waters leads to the conclusion that the number of ships we maintain in commission is sufficient for our present needs. On the more distant stations, except in China, our superiority is overwhelming.

ATLANTIC.

BRITISH (Cape and North American Stations).		FRENCH.
Coast-Defence Ship or 3rd-Class Battleship . .	Penelope	
1st-Class Cruisers, P. . .	Blake	Duquesne
" " " . .	St. George	
3rd-Class " " . .	Magicienne	
" " " . .	Barrosa	
" " " . .	Blonde	
" " " . .	Philomel	
" " PP. . .	Phœbe	
" " " . .	Canada	Roland
" " . .	Cleopatra	
" " . .	Mohawk	
" " . .	Racoon	
" " . .	Tartar	
" " . .	Tourmaline	
Sloops	3	1
Gunboats	7	

EAST INDIES.

BRITISH.		FRENCH.	
Coast-Defence Ship	Magdala	3rd-Cl. Cruiser .	Dupetit Thouars
		,, ,, .	Primauguet
2nd-Cl. Cruiser, P.	Bonaventure	Sloops and Gunboats . .	2
3rd-Class ,, P.	Marathon		
3rd-Cl. Cruisers	Brisk	2nd-Cl. Gunboats	4
,, ,,	Cossack		
Sloops & Gunboats	2		
Torpedo-Gunboats	1		
In Reserve— Coast-Defence Ship	Abyssinia		
Torpedo-Gunboat	1		
Torpedo-Boats, 1st Class . . .	3 (besides 3 in reserve, Bombay, 1 reserve, Calcutta)		

CHINA.

BRITISH.		FRANCE.	RUSSIA.
1st-Cl. Battleship.	Centurion		
Armoured Cruisers	Undaunted	Bayard Triomphante (Cochin China in reserve)	Admiral Nachimoff Pamyat Azova Vladimir Monomach
1st-Cl. Cruisers, P.	Gibraltar Edgar (temp.)	..	Admiral Korniloff
2nd-Cl. Cruisers, P.	Æolus (temp.) Spartan (temp.)	Alger (temp.) Isly (temp)	
2nd-Cl. Cruisers .	Leander Severn Mercury	Duguay Trouin	
3rd-Cl. Cruisers .	Alacrity Archer Caroline Porpoise	Beautemps-Beaupré Forfait	Rynda Kreyzer Razboynik Zabiyaka Corutz Mandjur
Sloops and 1st-Cl. Gunboats . .	10	1	2*
Smaller Gunboats	2	6 {2 in Cochin China, 1 in Tonkin}	3
Coast-Defence Ship . . .	Wivern (Hong Kong)	Styx † (Cochin China in reserve)	Gremiastchy † Otvazany †
Torpedo-Boats .	2 (in reserve, Hong Kong)		10 (in reserve, Vladivostock)

* Torpedo gunboats. † Armoured gunboats.

Owing to the war between China and Japan, the British Squadron in the China seas has been strengthened by one first-class and two second-class cruisers; the French Squadron by two second-class cruisers. If the Alger and Isly, and the Nachimoff, Pamyat Azova, and Korniloff are excepted, our ships in each class have a considerable advantage in speed over those of France and Russia. The British China Squadron is barely equal in strength to those of France and Russia combined. In view of the almost total absence of any French or Russian ships in other parts of the Pacific, some reinforcement should be possible from either the Australian or Pacific stations in case of need.

PACIFIC (including Australia).

British.		France.	
Armoured Cruiser	Orlando	3rd-Cl. Cruiser .	Duchaffault
1st-Cl. Cruiser, P.	Royal Arthur	Gunboat . .	Loyalty
2nd-Cl. Cruiser, P.	Sirius		
3rd-Cl. Cruisers, P.	Katoomba Barracouta Ringarooma Tauranga *In Reserve, Sydney*— Wallaroo Mildura		
3rd-Cl. Cruisers, P.	Hyacinth Pylades Rapid Royalist Satellite		
Sloops and 1st-Cl. Gunboats •	8		
Torpedo-Gunboats	2 (1 in reserve)		

Ships built and building.

It is impossible to arrive at a true estimate of the relative strength of two or more navies by a mere comparison of ships in commission. The whole available force of efficient fighting ships as well as the ships under construction must be taken into consideration. These are enumerated in the comparative tables in Part IV., of which the following table is a summary.* It may be usefully compared with a similar table on page 133 of the *Naval Annual* of 1894.

* Excluding ships only projected.

Class.	England.			France.			Russia.		
	Built.	Bldg.	Total.	Built.	Bldg.	Total.	Built.	Bldg.	Total.
Battleships—									
1st-Class	19	10	29	9	8	17	5	4	9
2nd-Class	12	..	12	9	2	11	5	3	8
3rd-Class	12	..	12	5	..	5	..	.	..
Total—Battleships .	43	10	53	23	10	33	10	7	17
Coast-Defence Ships . .	12	..	12	16	..	16	13	3	16
Cruisers—									
Armoured	17	..	17	5	4	9	8	1	9
Protected 1st-Class . .	11	2	13	2	2	4	1	..	1
„ 2nd & 3rd-Class .	51	9	60	7	12	19	3	..	3
Total—Cruisers . .	79	11	90	14	18	32	12	1	13
Look-out Ships . . .	19	..	19	12	..	12	..	..	..
Torpedo-Gunboats . .	32	..	32	11	2	13	8	..	8

Battleships completed.

We may insist again now, as we did last year, that our command of the sea depends upon battleships. As M. Weyl points out in his introductory remarks, the war in the East has afforded a further illustration of the truth of this doctrine. We have forty-three battleships completed as against twenty-three French, and ten Russian ships. A margin of ten may be considered satisfactory, but it must always be remembered that a Power which aspires to the command of the sea will have in many cases to oppose battleships to the coast-defence ships of her possible enemies.

In first-class battleships our position is at the present moment peculiarly good. We have nineteen ships, as against nine French and five Russian ships—a numerical superiority of five, owing to the greater rapidity of construction in British shipbuilding establishments. Eight ships are included in the British list which are more modern, and, apart from their greater size, more powerful than any ship as yet completed for the French Navy. The Russian battleship Paris has proved to be a myth.

We have twelve second-class battleships, as compared with nine French and five Russian ships. The Hercules and Sultan, though re-engined and refitted, have not been re-armed. They have been again placed in the list of third-class ships. The French list includes three ships built of wood, and four low free-board ships, classed by the French themselves as coast-defence ships. It will be strengthened before the close of the present year by the completion of the Bouvines and Tréhouart, which have a speed of nearly 17 knots, and consequently are faster than any vessels we have in this class. For the Russians the Gangoot has been completed since last year. The Cizoi Veliky, Rostislav, and Cizoi Veliky (No. 3) are on the stocks. In

second-class battleships we are clearly not up to our standard of strength, and our position must gradually grow worse.

We have twelve third-class battleships, and France five, while Russia has no ships of this class. The Penelope, though officially designated as a coast-defence ship, is included in this class, as being a high free-board ship, and certainly to be classified with the Triomphante, now in reserve in Cochin China. All the French ships of this class are built of wood. The Océan is dropped out of the list of effective ships, the Galissonnière and Marengo should probably be also excluded, while the Victorieuse, according to the proposals contained in the first estimates, was struck out of the French Navy List.

We may on the whole be satisfied with our present position. Our inferiority in second-class battleships is more than compensated for by our superiority in battleships of the first-class. What security have we for our position in the future? When these lists were prepared last year, we had only three battleships on the stocks as against sixteen Russian and French ships of the first and second classes. The new programme of shipbuilding which was shortly afterwards presented to Parliament and has since been taken in hand, did much to rectify the position, which now stands as follows:— Battleships building.

BATTLESHIPS BUILDING.

ENGLAND.

Laid Down.	Name.	Tonnage.
	Cæsar	14,900
	Hannibal	14,900
	Illustrious	14,900
	Jupiter	14,900
	Majestic	14,900
	Magnificent	14,900
	Mars	14,900
	Prince George	14,900
	Renown	12,350
	Victorious	14,900
	10 Ships	146,450

FRANCE.

Laid Down.	Name.	Tonnage.
	Brennus	10,806
	Bouvet	12,012
	Carnot	11,810
	Charles Martel	11,694
	Charlemagne	10,800
	Gaulois (A 7)	10,800
	Jauréguiberry	11,630
	Masséna	11,730
	St. Louis	10,800
	Bouvines	6,605
	Tréhouart	6,605
	11 Ships	115,292

RUSSIA.

Laid Down.	Name.	Tonnage.
	Petropavlosk	10,960
	Poltava	10,960
	Sevastopol	10,960
	Three Saints	12,480
	Cizoi Veliky	8,880
	Rostislav	8,880
	Cizoi Veliky (No. 3) . . .	8,880
	7 Ships . .	72,000

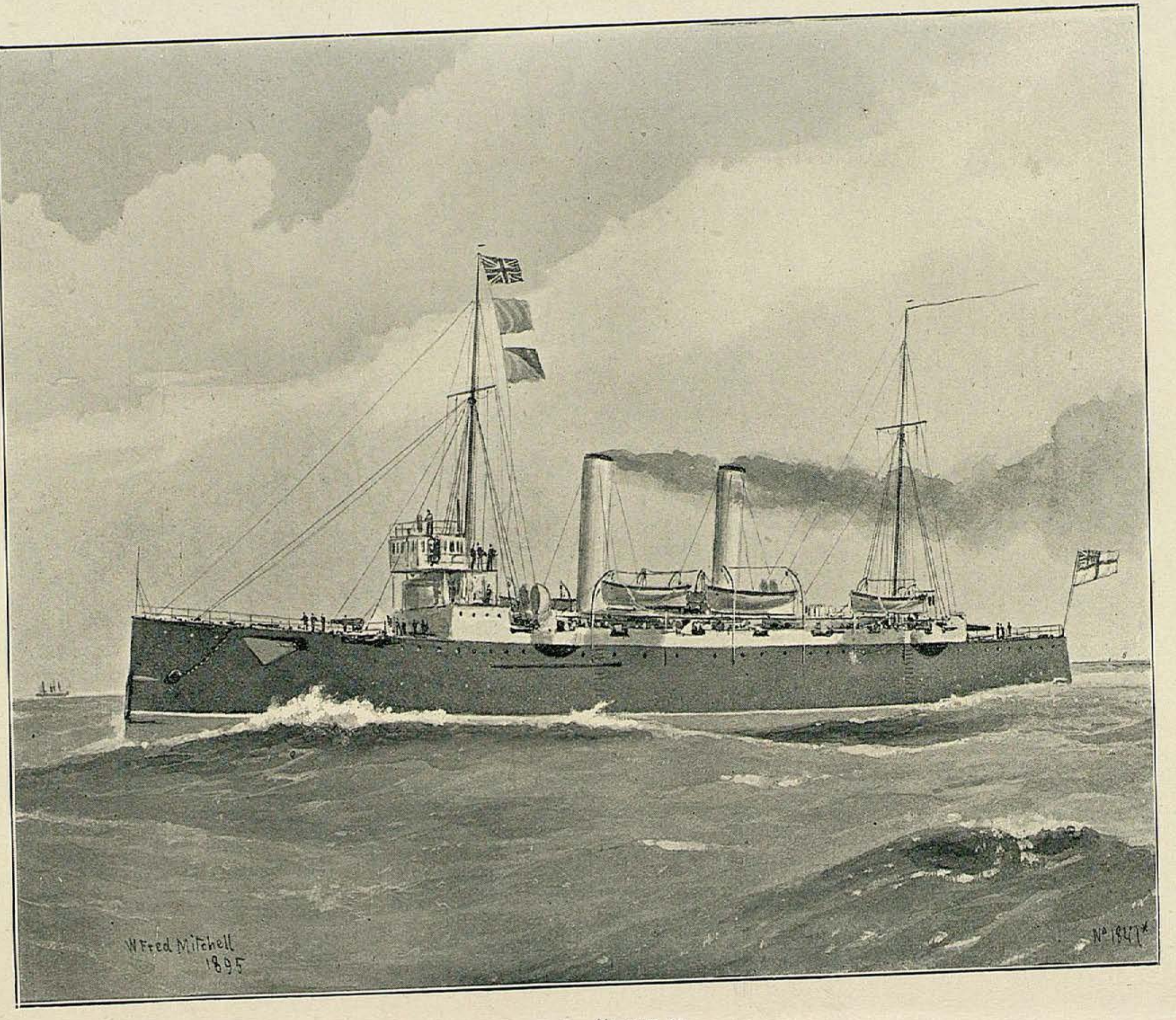
It will be observed that the Brennus, owing to the extensive reconstruction which she is undergoing, has again been included in the list of ships building.

We have ten ships building aggregating 146,450 tons, as compared with eighteen ships aggregating 187,292 tons building for France and Russia. If we were not able to build more rapidly than has hitherto been found possible either in France or Russia, the above comparison of the number of ships on the stocks would not be satisfactory to ourselves. It has already been pointed out in a previous chapter that an unprecedented rate of construction has been attained in the case of the Majestic and Magnificent. Both these vessels, it is said, will be completed in about two years from the time at which their first keel-plates were laid; but it would certainly be unsafe to assume as normal a shorter period of construction for this class of ship than three years. Bearing this fact in mind, we can only arrive at a conclusion as to whether the number of battleships now building for the British Navy is sufficient by a forecast of the relative position in future years. The date of completion of a ship can never be predicted with certainty. In England the estimated date of completion is often anticipated; abroad the proposed period of construction is often exceeded by years. The relative positions at the end of 1896 and 1897 will be somewhat as follows:—

BATTLESHIPS COMPLETED.

	England.		France.		Russia.	
	1896	1897	1896	1897	1896	1897
1st Class .	22	27	13	15	6	9
2nd Class .	12	12	11	11	5	6
3rd Class .	12	12	3	...	...	...
Total .	46	51	27	26	11	15

If the above figures are fairly accurate, there is no immediate ground for apprehension that we shall fall behind our standard of



H.M.S. "FOX."

strength in battleships, but it has already been pointed out that the power which aspires to the command of the sea must, as a rule, meet coast-defence ships with battleships.

Coast-defence ships.

In coast-defence ships we are exceedingly weak—we have twelve ships to sixteen French and fourteen Russian ships of this class; but it must be borne in mind that amongst the French ships are included eight armoured gunboats, and amongst the Russian three armoured gunboats and eight ships dating from the sixties, which have little fighting value. As for our coast-defence ships, only four are suited for operations of any kind on an enemy's coast, viz., the Belleisle, Orion, Hotspur, Rupert. Setting aside the French armoured gunboats and the antiquated Russian ships, there remain eleven coast-defence ships, to which we can only oppose four.

Armoured cruisers.

We have seventeen armoured cruisers built, the French have ten and the Russians eleven ships of this class built and building. That beautiful specimen of war-ship construction, the Warrior, has been struck out of the British list as no longer effective; the Black Prince must soon follow suit. We have thirteen first-class protected cruisers built and building, the French four, and the Russians none. Taking the armoured and the protected cruisers together, as has been done in the tables, the comparison stands: England, 30; France and Russia combined, 25. Two fast protected cruisers of about 8000 tons and 23 knots speed are to be laid down in France in the course of the present year.

Smaller cruisers.

We have sixty protected cruisers of the second and third classes, either built or in course of construction, to twenty-three French and Russian ships. The nine vessels of the Talbot class are of 5000 tons, and should, according to their displacement, be grouped with other first-class cruisers.

We have twenty-seven older cruisers, eighteen of which are partially protected, whose speed does not exceed fourteen knots. The French have twenty-two ships, none of which are protected, but whose speed in most cases exceeds that of the British ships by one or two knots.

Taking ships built and building together, we possess at present a slight superiority in first-class cruisers. In second and third-class cruisers we possess a superiority of more than two to one. Taking into consideration the enormous commercial and maritime interests of Great Britain as compared with those of France and Russia, it cannot be said that our superiority in cruisers is excessive. It may well be doubted whether it is sufficient for our needs.

CHAPTER IV.

British Manœuvres in 1894.

The British naval manœuvres of 1894 were the shortest and most decisive on record. The latter characteristic was a clear advantage so far as it went; the former very much the reverse. It is always an advantage when a problem, indeterminate in the abstract, is found to yield in the concrete a definite and decisive solution, and the only danger is that unsound and illegitimate inferences of an abstract and general character should be drawn from a solution which is, in the nature of the case, purely concrete and particular. We shall see in the sequel that the manœuvres of 1894 were peculiarly exposed to this danger, and that they did not entirely escape it in the issue. The extreme brevity of the manœuvres was, on the other hand, almost an unmixed disadvantage. The *maximum* duration of the operations was fixed by the Admiralty at a period of ten days. In a little more than thirty-six hours after hostilities actually began, matters were brought to such an issue that the two contending admirals agreed to retire to their respective ports and await the decision of the umpires. This decision was not received until more than forty-eight hours after the contending fleets had parted company, and its award amounted to a recognition of the complete and decisive victory of one side over the other. All the fleets were accordingly ordered back to their final places of assembly, carrying out target practice by the way. Thus the contemplated period of ten days was reduced to a period of less than two, followed by a period of inactivity of more than forty-eight hours; and, however highly we may estimate the strategic value of the operations and their results, it can hardly be denied that their educational value in the instruction at sea of the large number of officers and men engaged was reduced almost to a *minimum*.

It is to be regretted that, as soon as the umpires' award was published, the fleets were not again ordered to sea with instructions to engage in ordinary fleet evolutions and other educational exercises for what remained of the period originally assigned to the operations, and it is perhaps worth while to point out that a system which

requires all disputed points to be referred to umpires sitting in London is deplorably dilatory in operation, and to that extent unsatisfactory in result.

The general scheme of operations was a modification and development of those of the two preceding years. It is defined in the following extract from the official report, which also gives the composition and stations of the several fleets and flotillas :— Scheme of operations.

"The two sides engaged in the 1894 manœuvres were designated respectively the 'Red' and the 'Blue.' Each was divided into two fleets, and to the 'Red' side six, and to the 'Blue' side twenty-four torpedo-boats were assigned.

"The limits of the manœuvre area were: On the north, 57° N. latitude; on the south, 47° 20′ N. latitude; on the east, the western coast of Great Britain, and the south coast to 4° W. longitude; on the west, 15° W. longitude.

"There was a 'forbidden belt' which was not to be crossed after the termination of the preliminary cruise by vessels of either side. This belt was included between a line drawn from Brow Head to latitude 47° 20′ N., longitude 15° W., and another line parallel to the first, drawn from the point at which the 9th meridian cuts the South Coast of Ireland to latitude 47° 20′ N.

"Territory was assigned to the two sides as follows:

"On the south coast of England—From Stoke Point to the Lizard, both included, Red.

"On the west coast of Great Britain—From Rhossili Point to St. Bees Head, both included, with Anglesea and Holyhead Island, Blue.

"On the east coast of Ireland—From White Head to Orlock Point, both included, Red; from Clogher Head to Galley Head, both included, Blue.

"On the west coast of Ireland—From Brow Head to Recnada Point, both included, Red; from Bunbane to Broadhaven Bay, both included, Blue.

"The Scilly Isles, the Isle of Man, the Scotch Islands, and the remaining coasts of the United Kingdom not specified as being Red or Blue were 'neutral.' For the purposes of these manœuvres, 'neutral' waters were to extend one mile beyond the 5-fathoms line off 'neutral' territory.

"The Red ports, Belfast, Bantry Bay, Falmouth, and its roads were assumed to be fortified, and Red ships in them were not open to attack by ships; but no Red port was to give security to ships against torpedo-boat attack, except the portion of Belfast Lough to the westward of a line joining Carrickfergus Castle and Cultra Mill Stump. The Blue ports, Queenstown and the Shannon, were assumed to be

fortified, and Blue ships in them were not open to attack of any kind. Red torpedo-boats in Belfast Harbour were secure against attack. Blue torpedo-boats in Milford Haven, Holyhead, Piel (near Barrow-in-Furness), Queenstown, Kingstown, and Waterford were secure against attack. Other ports were to give no protection. Ships of Group 1 or 2 going into Milford Haven would be out of action for twenty-four hours; but Blue ships already out of action from other causes might go there and stay until the term for which they were out of action had expired.

"The vessels of one side were not permitted to reconnoitre the ports assigned to the other, unless permission was given, until 'hostilities' began.

"The fleets and torpedo-boat flotillas, together with the torpedo-boat stations, are given in the following list:—

RED SIDE.

Vice-Admiral R. O'B. FitzRoy, C.B.

The "A" Fleet.	The "B" Fleet.
Vice-Admiral R. O'B. FitzRoy, C.B.	Rear-Admiral A. T. Dale.
1st Assembly, Portland.	1st Assembly, Berehaven.
2nd „ Falmouth.	2nd „ Berehaven.
Group 1.	*Group* 1.
Royal Sovereign.	Empress of India.
Resolution.	Repulse.
Devastation.	Conqueror.
Blenheim.	Astræa.
Endymion.	Theseus.
Bonaventure.	Gibraltar.
Group 2.	*Group* 2.
Brilliant.	Latona.
Sappho.	Andromache.
Scylla.	Medea.
Terpsichore.	Medusa.
Thetis.	Pearl.
Rainbow.	Barrosa.
Group 3.	*Group* 3.
Speedy.	Alarm.
Circe.	Onyx.
Renard.	Sheldrake.
Seagull.	Gossamer.
Speedwell.	
Antelope.	
Rattlesnake.	
Spider.	
Havock.	
Hornet.	

Torpedo-Boat Flotilla, etc.:—1st Assembly, Portland; 2nd Assembly, Belfast.

Special Service Vessel:—Rupert.

Torpedo-Boats*:—45, 52, 53*d*, 80*d*, 85, 87.

Station:—Belfast.

* Divisional torpedo-boats are distinguished by the letter *d* placed after their numbers.

BLUE SIDE.

REAR-ADMIRAL E. H. SEYMOUR, C.B.

THE "C" FLEET.

Rear-Admiral E. H. Seymour, C.B.

1st Assembly, Torbay.
2nd ,, Queenstown.

Group 1.
Alexandra.
Barfleur.
Benbow.
Inflexible.
Colossus.
Edinburgh.
St. George.

Group 2.
Mersey.
Melampus.
Tribune.
Intrepid.
Iphigenia.
Indefatigable.
Pique.

Group 3.
Niger.
Jason.
Leda.

THE "D" FLEET.

Rear-Admiral E. C. Drummond.

1st Assembly, Milford Haven.
2nd ,, The Shannon.

Group 1.
Warspite.
Aurora.
Galatea.
Australia.

Group 2.
Sybille.
Naiad.
Apollo.

Group 3.
Hebe.
Jaseur.*
Salamander.

TORPEDO-BOAT FLOTILLA, ETC. :—1st Assembly, Falmouth. 2nd Assembly, the respective Stations.

SPECIAL SERVICE VESSELS :—Curlew, Traveller, Magnet, Bullfrog, Basilisk, Trent.

TORPEDO-BOATS :— 50, 59, 60*d*, 26, † 27, 93*d*, 66, 77, 79*d*, 64, 65, 67*d*, 81*d*, 83, 84, 72*d*, 73, 74.

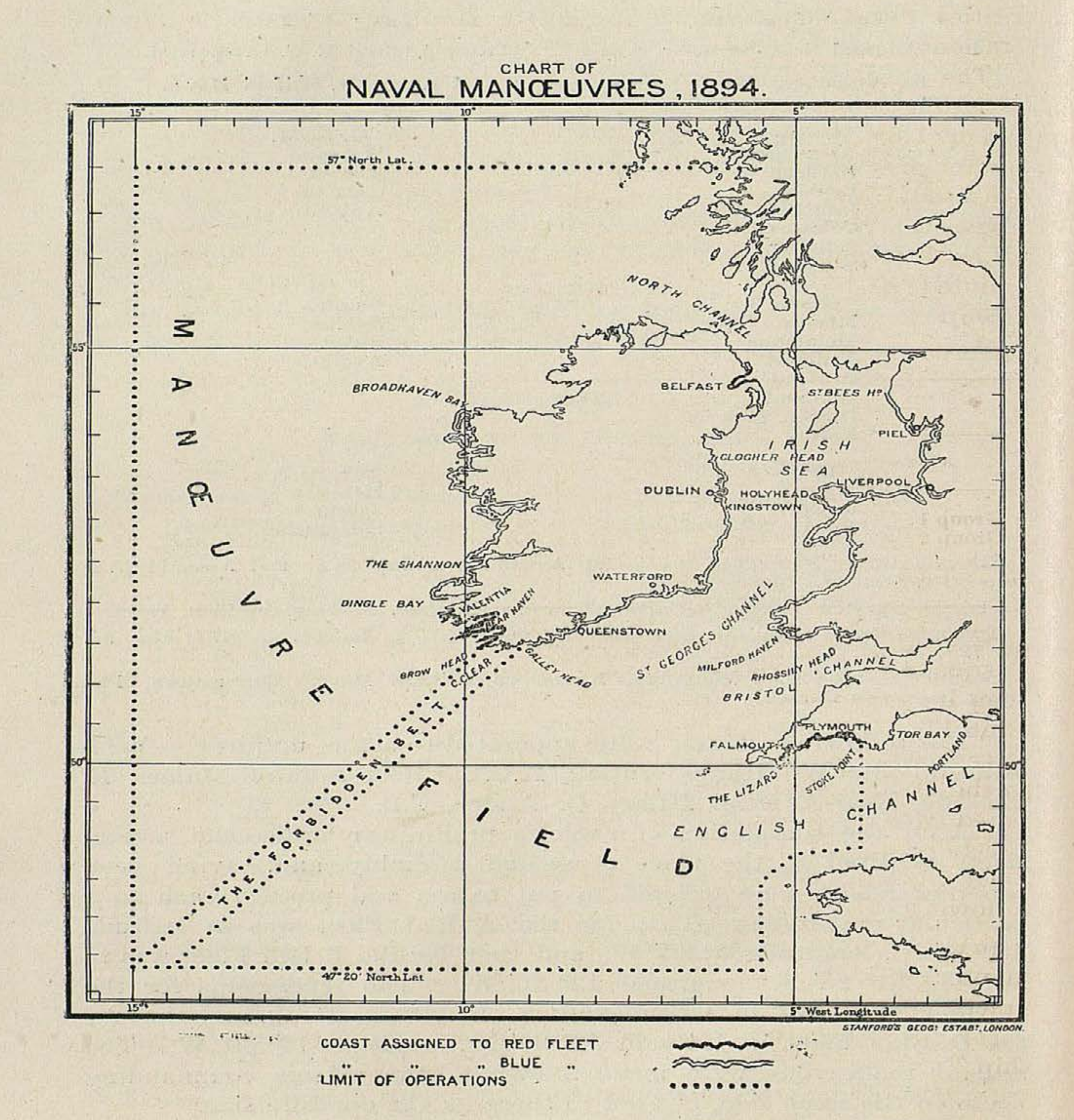
STATIONS :—Holyhead, Waterford, Kingstown, Milford Haven, Queenstown, Piel (near Barrow-in-Furness).

"The following officers were appointed to act as umpires :—Vice-Admiral Sir W. Hunt Grubbe, K.C.B., Rear-Admiral James E. Erskine, Rear-Admiral Hilary G. Andoe, C.B.

"After the completion of a week's preliminary cruise the several fleets repaired to the place of second assembly, and, having been reported ready, were ordered to put to sea and proceed each to a particular rendezvous. That for the A Red Fleet was in latitude 48° 30′ N., longitude 6° 30′ W., and that for the B Red Fleet was in latitude 51° 25′ N., longitude 12° 30′ W. The rendezvous for the C Blue Fleet was in latitude 50° N., longitude 9° W., and that for the D Blue Fleet in latitude 52° 30′ N., longitude 12° 30′ W. The several rendezvous were made known to the officers commanding fleets on the same side, but not to those on the opposite side.

"On the 2nd August, the several fleets proceeded to the rendezvous named above, having been ordered to do so by telegram containing

* Replaced by Dryad. † Replaced by No. 78.


CHART OF
NAVAL MANŒUVRES, 1894.
57° North Lat.
47° 20' North Lat.
5° West Longitude
MANŒUVRE FIELD
THE FORBIDDEN BELT
NORTH CHANNEL
BROADHAVEN BAY
BELFAST
ST BEES HD
IRISH SEA
PIEL
CLOGHER HEAD
DUBLIN
HOLYHEAD
KINGSTOWN
LIVERPOOL
THE SHANNON
WATERFORD
DINGLE BAY
VALENTIA
QUEENSTOWN
ST GEORGE'S CHANNEL
MILFORD HAVEN
BROW HEAD
C. CLEAR
GALLEY HEAD
RHOSSILLY HEAD
BRISTOL CHANNEL
PLYMOUTH
TOR BAY
FALMOUTH
PORTLAND
THE LIZARD
STOKE POINT
ENGLISH CHANNEL
STANFORD'S GEOG! ESTAB!, LONDON.
COAST ASSIGNED TO RED FLEET
" " " BLUE "
LIMIT OF OPERATIONS

an announcement that 'hostilities' were to begin at 9 P.M. on the 3rd August. At 11 A.M. on the 3rd, the time of beginning 'hostilities' was made known to the torpedo-boat stations and signal stations."

The relative strength of the several fleets was determined by assigning a numerical coefficient to the vessels in each group. In Group 1 of all the fleets all first-class battleships were to count five points and all other ships four points, with the exception of the Alexandra, the flagship of the Blue Commander-in-Chief, which was given the brevet rank of a first-class battleship for the occasion and allowed to count five points. In Group 2 of all the fleets each ship counted one point. No points were assigned to the vessels in Group 3. These values may best be exhibited in the following table :— Relative strength of fleets.

RED SIDE.		BLUE SIDE.	
A FLEET.	B FLEET.	C FLEET.	D FLEET.
Group 1. . 26 Group 2. . 6	Group 1. . 26 Group 2. . 6	Group 1. . 31 Group 2. . 7	Group 1. . 16 Group 2. . 3
Total . 32	Total . 32	Total . 38	Total . 19

The condition of a decisive action between any two opposing fleets or squadrons was that the superior force engaged should be stronger than its adversary by at least one-ninth of the latter. Thus the C Blue Fleet was superior in the required proportion to either of its Red adversaries, but the Red Fleets were both superior in the same sense to the D Blue Fleet. On the other hand, the two Red Fleets combined were superior in the required proportion to the two Blue Fleets combined.

Of the rules for engaging and other general regulations only the following need be quoted :—

(*a*) "Nothing is to be done by any person engaged in the manœuvres which would not be permissible, or likely to be practicable, in time of war."

(*b*) "No ship is to approach within eight cables of an enemy's ship."

(*c*) "Ships or torpedo-boats entering neutral waters, or communicating in any way with the shore in neutral territory, are to be out of action for twenty-four hours."

(*d*) "An enemy's ship coming within 6000 yards of the entrance to a fortified port will be out of action for twenty-four hours."

F

Analogy with position of England and France.

If the situations of the several fleets and the extent of the territory of the two sides be considered, it will be seen that the scheme of operations was founded more or less directly on the analogy of a naval war in European waters between England and France. To the Blue side was assigned a large extent of territory on either shore of St. George's Channel, just as in the analogous situation France would possess her Mediterranean coast and the northern shore of Africa from the frontier of Morocco to that of Tripoli. By virtue of the same analogy Queenstown would represent Toulon, Falmouth Malta, Berehaven Plymouth, the Shannon Brest, and Belfast Gibraltar. The closing of the anchorage of Milford Haven to the larger vessels of both sides would seem to place that anchorage in a situation analogous to that of Biserta, which is not yet accessible to ships of large draught. Such indeed was the analogy obviously suggested by the general idea of the proposed operations, and this analogy was strengthened by the fact that the distances from Belfast of the several points at which the fleets were stationed at the beginning of hostilities were in each case approximately proportional to the distances from Gibraltar of Malta, Toulon, Brest and Plymouth respectively. But it is important to bear in mind that a mere analogy is no exact reproduction of the situation to which it is analogous. It is not safe to infer from the results of the operations that the same results would follow in actual warfare. Without dwelling on other points in which the analogy fails, it may suffice to point out that the distances to be traversed by the separate fleets of the two sides before they could come into strategic contact with one another were not much more than a third of the corresponding distances which the English and French Fleets would have to traverse in the analogous situation. This means, of course, first, that the fleet which possessed the superior speed had only one-third of the advantage which it would have obtained if the distances had been three times as great; and, secondly, that a concentration which was possible in the manœuvres might in actual warfare be frustrated or impeded by the necessity which the fleets would be under of obtaining a fresh supply of coal before they could effect a junction, or before they could fight a battle after having effected a junction. It follows that many strategical dispositions which were possible in the limited area of the manœuvre field would have been imprudent and even practically inadmissible in the much larger field of operations which would be involved in a naval war between England and France. Furthermore, it is very far from probable, indeed it is in the last degree improbable, that the respective fleets would, at the outbreak of a war between England and France, be found to be

occupying the relative positions which, for specific purposes and for the elucidation of a specific problem, were deliberately assigned to the several fleets engaged in the manœuvres.

Objective of operations.

No specific instructions appear to have been given to the Red and Blue commanders-in-chief as to the precise mode in which they should conduct the operations, or the particular objective at which they should aim. "Red and Blue are two opposing naval forces; the composition of each is known to both sides." This was the only definition given of the general strategic situation. But it was quite sufficient to determine the whole character of the operations. The relative strength of the two sides was so approximately equal that it was plain that the strategical advantage could only be obtained first by manœuvring for it, and in the last resort by fighting for it. In other words, the command of the sea was in dispute, and as each side might hope to secure it by taking its adversary at a disadvantage, it was evident that neither side could hesitate to try conclusions in the open. It was equally evident that for the Red side, which united was superior to the Blue side, concentration of its divided forces was the main object to be aimed at. On the other hand, unless the Blue Fleets could, by effecting a prior concentration, succeed in keeping their two adversaries apart and in defeating them singly, they could not hope for ultimate success. The D Blue Fleet was inferior to both its adversaries, and therefore could not be left to run the risk of encountering either of them alone. The C Blue Fleet being superior to both its adversaries might indeed have acted independently against one of them, but only at the risk of leaving the D Blue Fleet to be overwhelmed by the other. Hence while immediate concentration was the primary object which the strategic conditions required both sides to aim at, it was essential to the success of the Blue side that it should be able to attain this object in advance of its adversary, and to concentrate in such a position as would enable it to prevent the junction of the two Red Fleets by defeating one of them in detail. For this reason it was almost certain that the operations would, in the first instance, take the form of a race of both sides for position, and this in fact was the form it did take.

Commencement of operations.

The several fleets left their respective anchorages on the afternoon of Thursday, August 2nd. Each fleet was, as we have seen, ordered by the Admiralty to proceed to an appointed station and wait there until 9 P.M. on Friday, August 3rd, at which hour war was to be declared. The stations assigned to each side were made known to both fleets of that side, but neither side was informed of the stations assigned to its adversaries. This disposition of the fleets at stations unknown

to their adversaries was perhaps merely designed to afford opportunity for practice in scouting; but so far as it had any strategic significance it appears to have been based on the assumption that when war breaks out between two Powers their fleets will be at sea and not in their own ports. The assumption is perhaps a hazardous one, but even if valid in the case of actual warfare, it can hardly be applied in all its implications to the case of manœuvres. Manœuvres must be based on a definite general idea; and the idea itself might easily be rendered altogether indefinite, and the problem founded on it might thereby be rendered insoluble, by the device adopted by the Admiralty. If, for example, the A Red Fleet had been assigned a station 150 miles nearer the entrance to the St. George's Channel than the station assigned to the C Blue Fleet, and the B Red Fleet had been assigned a station 150 miles nearer to the North Channel than the D Blue Fleet, nothing that the Blue side could do could avert its complete discomfiture. In like manner, a similar initial advantage of station assigned to the Blue side over the Red side would have deprived the Red side of all chance of frustrating or even of seriously molesting the concentration of the two Blue Fleets in any intermediate position which might be chosen by the Blue Commander. Hence it was perhaps reasonable to assume that, although the exact position assigned to the fleets of one side was concealed from the other, neither side would obtain from this disposition any such advantage as would be inconsistent with the general idea involved in the scheme of operations. In that case, however, the analogy of actual warfare would so far be abandoned. If in actual warfare a fleet were to leave its port before the outbreak of hostilities, its purpose in so doing would certainly be not merely to hide itself, but to place itself in some position of advantage by getting nearer to its real objective. Fleets do not put to sea merely for the purpose of hiding themselves any more than armies take the field if they do not intend to fight. No advantage to be derived from concealment by a fleet anxious to avoid an engagement can be equal to that which such a fleet already possesses in the secure protection of a port inaccessible to the naval forces of its enemy. Hence if an enemy's fleet were to begin the campaign by putting to sea, its adversary would know that it had some strategic object in view which would and must involve a readiness to fight in the open. He might be at a loss to divine its precise purpose—as Nelson was on the two occasions when Villeneuve left Toulon during the campaign which ended at Trafalgar—but he would know for certain that it aimed at a definite objective, and was not merely actuated by the aimless and futile purpose of eluding

observation indefinitely. In the manœuvres, however, the objective of both sides was sufficiently defined beforehand, and therefore the sole advantage which in actual warfare a fleet could gain by putting to sea before the outbreak of hostilities was by the hypothesis denied to both sides. There was thus no real analogy between the conditions of actual warfare and the initial dispositions imposed by the Admiralty on the Red and Blue sides during the manœuvres. The commander of each side, knowing exactly where his own fleets were, would be entitled to assume that the fleets of his adversary would be placed in analogous positions; on any other hypothesis the whole scheme of the manœuvres would have been stultified at the outset, and the final advantage might have been assured to that side on which an initial advantage had been conferred. In actual warfare, on the other hand, it stands to reason that fleets do not and cannot fight in this way. If one combatant puts to sea, his adversary will know where to look for him if he knows his objective; if he does not know his objective, he will either pursue an independent objective of his own, or will make for the most advantageous position accessible to him, and wait until the enemy's objective is disclosed. The last thing he will think of will be to place himself in a position which bears no strategic relation whatever either to his own objective or to that which he attributes to the enemy.

Position of fleets.

As a matter of fact, the outbreak of hostilities found the several fleets all placed by the Admiralty in analogous positions. Had they started from their respective ports of final assembly, the strategic conditions would have been substantially identical with what they actually were. The only difference was that each commander was left in some uncertainty as to the exact whereabouts of his nearest adversary, an uncertainty tempered by the consideration that the Admiralty was not at all likely to stultify the whole scheme of operations by giving an indefeasible advantage to one side over the other. The A Red Fleet, being originally at Falmouth, some 175 miles from Carnsore Point, at the south-western entrance to St. George's Channel, was placed in latitude 48° 30′ N., longitude 6° 30′ W., some 60 miles west of Ushant, and some 225 miles from Carnsore Point. From this it might be inferred that the C Blue Fleet, having been originally at Queenstown, some 75 miles from Carnsore Point, would be placed at some position not less than 125 miles from the same point. As a matter of fact, it was placed in latitude 50° N., longitude 9° W., at a distance of some 170 miles from Carnsore Point; but the increased proportional distance did not deprive Admiral Seymour of the advantage of the interior position, nor otherwise materially affect the fundamental conditions of the strategic

situation. The B Red Fleet, being originally in the Shannon, was placed in latitude 51° 25′ N., longitude 12° 30′ W., some 60 miles to the westward of that river, and the D Blue Fleet was placed in latitude 52° 30′ N., longitude 12° 30′ W., at the same relative distance from Bantry Bay, its final place of assembly.

Blue Fleets hold interior positions.

Thus the Blue side enjoyed in both cases the great initial advantage of holding the interior positions. The Blue commander could not, indeed, assume with certainty that this advantage was his, because he knew nothing for certain of the exact position of his adversaries. But he was bound nevertheless to act on the hypothesis that this advantage was still his, and that nothing had been done to deprive him of it, although the precise conditions on which it depended might have undergone some comparatively immaterial variation, because on any other hypothesis he would have been reduced to a position of strategic impotence. Holding the interior positions, then, the dominant motive of his strategy must be a desire not to sacrifice that advantage, as the two Blue Fleets were presumably nearer to each other by several hours' steaming than the two Red Fleets, and as the difference of speed between the two sides, though considerable, was insufficient to eliminate this advantage, it was certain that the two Blue Fleets would be able to effect a junction at almost any point in the sea between them before either of the Red Fleets would be able to reach the rendezvous agreed upon. The choice of such a rendezvous presented a variety of very perplexing alternatives. There are four lines on which a concentration and junction of the Blue Fleets might have been effected. These are the line between Carnsore Point and St. David's Head, the line between Queenstown and Holyhead, the line between Belfast Lough and the Mull of Galloway, and the line between Fair Head and the Mull of Cantire. Each of these lines presented certain advantages and disadvantages. The two southernmost were longest in extent, and therefore most difficult to hold effectively. The Belfast line would expose the Blue Fleets to perpetual molestation from the Red torpedo-boats stationed at Belfast. The North Channel or Mull of Cantire line was exposed, though less exposed, to this disadvantage, but it presented a compensating advantage in being the shortest of all, and, if occupied without delay, in preventing the access of the B Red Fleet to Belfast, and thereby compelling its commander to send back to Berehaven if he desired to communicate with the Red Commander-in-chief.

Alternatives open to Blue Commander.

If concentration of his divided forces on one or other of these lines was rejected as his primary objective by the Blue Commander, the only alternative was for the C Blue Fleet to endeavour, by scouting, to gain touch with the A Red Fleet in the southern area of the

manœuvre field; and having discovered it, to overpower it before the B Red Fleet could appear on the scene. But this alternative offered few, if any, advantages and many hazards. It might have been possible for the C Blue Fleet to discover the A Red Fleet at an early stage of the operations; but even so, it was not in the power of the former to bring the latter, which was collectively superior in speed, to an action. The strategy in question would, moreover, either have left the D Blue Fleet in the air, or have compelled the Blue Commander-in-chief to hamper his own movements by the recurring necessity of seeking the D Blue Fleet at a series of rendezvous preconcerted for the purpose. These rendezvous must have been all to the southward or westward of Carnsore Point, and as the B Red Fleet would be at the heels of the D Blue Fleet, and might overtake it by leaving the Conqueror astern—which could be done without impairing the relative superiority of the former—the strategy in question might easily have led to the decisive defeat of the D Blue Fleet without securing any corresponding advantage to the C Blue Fleet.

This latter alternative thus seems to be disallowed by considerations at once obvious and cogent. Of the four others previously enumerated, two require little discussion. The Holyhead line presented little or no advantage over the St. David's Head line, the Belfast line was decidedly inferior to the Mull of Cantire line. The choice really lay, therefore, between the extreme southern and the extreme northern lines. The latter was by far the shorter of the two; but it was further removed from the coaling bases open to the Blue Fleets, and from the stations of the Blue torpedo-boats. It could not be occupied without bringing one or other, and probably both, of the Blue Fleets within the range of the Red torpedo-boats at night, while they were effecting their junction, and it was at all times accessible to the attack of the same torpedo-boats. Moreover, its occupation gave the Red Commander-in-chief access to the Red port of Belfast unmolested, except by the Blue torpedo-boats stationed on either side of the Irish Channel. Nevertheless, it offered the great advantage of enabling the Blue Commander to occupy with his united forces a position which neither of the Red Fleets could pass unobserved; and even if it should happen—as it actually did—that the B Red Fleet had got to the southward of this position before it could be occupied by the combined Blue Fleets, it was almost certain that the B Red Fleet might still be intercepted, and contained or defeated before it could reach Belfast, and before it could join hands with the A Red Fleet. It is true that even when the combined Blue Fleets had occupied this position, they would still be exposed to a concerted and simultaneous attack

Alternatives discussed.

from the two Red Fleets; but the concert necessary to such an attack could only be established by re-opening communications between the two Red Fleets, and this could only be done after such lapse of time as was required to enable the Commander of the B Red Fleet to send a cruiser back to Berehaven, and thence communicate by telegraph with the Red Commander-in-chief at Belfast. In the meanwhile, the B Red Fleet would be exposed to an overwhelming attack from a portion of the combined Blue Fleets; and the A Red Fleet, if it kept the sea, would be open to the attack of the Blue torpedo-boats in the Irish Channel. It is true that if the combined Red attack could be accomplished, Blue would in the end be overpowered; but that result was inherent in the conditions of the case, unless the total of the Red forces could in the meantime be sufficiently diminished, either by torpedo attack in the Irish Channel, or by an engagement between Blue and B Red somewhere in the open, outside the North Channel.

Most of these considerations apply, *mutatis mutandis*, to the alternative occupation of the St. David's Head line. But this line was much longer and, *pro tanto*, more difficult effectively to watch. The A Red Fleet was faster than either of the Blue Fleets. Except by occupying the whole of the line, and therefore disposing his ships at some distance apart, the Blue Commander could not be certain of detecting the passage of the A Red Fleet. But if he disposed his fleet in this fashion, he would be unable to concentrate it in time to dispute the passage of his adversary, or at any rate to bring him with certainty to a decisive action. If, on the other hand, the A Red Fleet were divided into two squadrons, with the view of passing at different points of the Channel to be guarded, the Red Commander would only have to send one of his squadrons somewhat in advance of the other to make almost certain of drawing off the Blue Fleet in pursuit, and thereby of leaving some portion of the Channel open to the other squadron. As a matter of fact, this was the disposition actually adopted by the Red Commander-in-Chief, and it is more than doubtful whether the Blue Commander could have answered it effectually, had he been found in the position in which his adversary evidently expected to find him.

Strategy adopted by Blue Commander.

However this may be, Admiral Seymour, in command of the Blue side, appears to have held that the balance of advantage turned in favour of the northern position, and this he accordingly decided to occupy. Two things were essential to such success as the conditions of the problem permitted him to hope for. One was to join hands as soon as possible with the D Blue Fleet, which was quite incapable of trying conclusions single-handed with either of its adversaries; the other was to do this before either of the Red Fleets could appear

upon the scene. If these two purposes could be effected, they offered as much advantage to the Blue side as was compatible with the conditions of the case, though the ultimate victory might still have been doubtful, and largely dependent on the further development of events; if, on the other hand, they could not be effected, nothing whatever could be done. The immediate and unmolested concentration of the Blue forces was, in fact, a condition precedent of any success which the Blue side could even in the most favourable circumstances hope to obtain; on the other hand, the concentration of the Red Fleets with forces unimpaired would suffice of itself to secure the ultimate victory of the Red side.

The race for position.

For this reason the operations almost necessarily took the form of a race, but it was a race in which it was far more necessary for the Blue Commander than it was for his adversary to win the first heat. If he lost that, he lost everything. If, on the other hand, the Red Commander was worsted in this contest for position, he might still look for ulterior success to the superiority of his united forces and his power of concentrated and simultaneous attack on his inferior adversary. As a matter of fact, Admiral FitzRoy does not seem to have attempted to win the first heat. Had he done so, it can hardly be doubted that he would have been successful. It is true that he ordered the B Red Fleet to make the best of its way round the north of Ireland, which it did at a speed of 12 knots, this limit being determined by the speed of the Conqueror; but he himself loitered in the open, taking a devious course, and adopting a speed of 10 knots, subsequently increased to 12, so as to reach the entrance to St. George's Channel after nightfall. It would appear that he relied upon the strategy which, as we have seen, Admiral Seymour did not see his way to meet. He seems to have expected that Admiral Seymour would attempt to intercept him at the southern entrance to the Irish Channel, and with that expectation he so timed his movements that the main body of his fleet would be off Carnsore Point about midnight on August 4th, a strong detachment of his cruisers being ordered to pass through the middle of the Channel at a somewhat earlier hour, and to make the best of its way, at a speed of 17 knots, to a preconcerted rendezvous with the B Red Fleet. The composition and proceedings of this detached squadron are described as follows in the official report:—"The cruisers Brilliant, Rainbow, Sappho, Scylla, Terpsichore, and Thetis, and the gunboats Antelope, Rattlesnake, Circe, and Renard were detached to proceed on 'cruisers' line of advance.' These vessels were to steam at 17 knots, shaping a course to pass in mid-channel off The Tuskar, and then proceed to join the B Fleet off Rathlin. The object was to

form a squadron which, being seen at night, might pass for their own—A—Fleet, and draw off the enemy's main fleet, but go at too great speed for torpedo-boats to do it any mischief. This detached squadron had orders to get back on to the line of advance of the rear of the A Fleet, which, after passing Strangford, would be about 3½ hours astern of them." The main body of the A Fleet quickened to 15 knots at nightfall, and maintained that speed during the night, leaving the Devastation astern.

Strategy of Red Commander.

This disposition appears to be open to criticism on various grounds. It wasted time at the outset, and the loss of time it involved ultimately turned the scale in favour of the Blue side. There appears, moreover, to have been no sufficient reason for the delay. Admiral FitzRoy was well supplied with fast cruisers, and in particular the Havock and the Hornet, the fastest vessels afloat, were attached to his fleet. It was in his power, therefore, to ascertain by means of his scouts whether Admiral Seymour had, as a matter of fact, adopted the disposition attributed to him, and if it had been found, as it would have been found, that the Channel was left unguarded, except by the Blue torpedo-boats, there was nothing to prevent Admiral FitzRoy from passing it several hours earlier. If, on the other hand, the Channel had been found to be guarded, the main body of the A Red Fleet could have been kept at such a distance as to be fairly safe from observation, and quite safe from attack by its adversary until such time as its commander thought he could attempt to force the passage under cover of the night. It will, moreover, be observed that the disposition adopted by Admiral FitzRoy was based on a total disregard of the Blue torpedo-boats. This was completely justified by the result; but if it was a prudent proceeding, it will be necessary entirely to reconsider the value hitherto assigned by the majority of naval authorities to the torpedo-boat factor in the operations of sea-going fleets. This question, however, will be more conveniently reserved for fuller discussion in the sequel.

Proceedings of Blue Fleets.

We may here leave the A Red Fleet for the present, and follow the movements of the Blue side. The D Blue Fleet left its rendezvous at the appointed time, and proceeded towards the North Channel at a speed of 14 knots. Off the Bloody Foreland two cruisers were observed, which were reconnoitred and found to be enemies. They followed the D Blue Fleet, but kept out of range. At 9 p.m. on August 4, three torpedo-boats were observed. They steamed to the southward, inside the Maidens. At 10.20 p.m. the D Blue Fleet was attacked by three torpedo-boats, all of which it claimed to have put out of action. One boat fired her torpedo, but it did not hit a ship. In the meanwhile Admiral Seymour, using his best speed

—which was that of the Inflexible and did not exceed 10 knots —had passed Carnsore Point about noon on August 4, twelve hours in advance of Admiral FitzRoy, and had held his course through the Irish Channel. About 2.30 A.M. on the morning of August 5, a junction was effected with the main body of Admiral Drummond's Fleet, about five miles to the northward of the Calf of Man, and the combined Blue Fleets then proceeded to make the best of their way to the North Channel. Some little delay was caused after the two fleets first sighted each other, by an unusual and unforeseen difficulty which was experienced in communicating by signal. The two fleets had recognised each other, and the two flagships lay at some considerable distance apart. The day was breaking, and there was already sufficient light to render night signals indistinct, and yet not sufficient to render flag signals distinguishable. The difficulty was not, of course, insuperable, and had the consequences of delay been regarded as critical or even serious, it might no doubt have been surmounted. But it will be seen shortly that it jeopardised and might even have prevented the success of the Blue side. A very instructive torpedo episode which occurred shortly before the junction of the Blue Fleets is reserved for separate consideration.

Action with B Red Fleet.

Proceeding northwards, and having passed Belfast unmolested, the united Blue Fleets (the Aurora being absent, having lost touch with her consorts during the night) encountered the B Red Fleet under the command of Admiral Dale in a position abreast of the Maidens, a detached but inhabited rock off the coast of Ireland, some twelve miles to the north of the entrance to Belfast Lough. The Blue Fleets were so disposed that it was impossible for the B Red to pass between them and the Maidens without violating one or other of two rules quoted at the outset. One rule said that "no ship is to approach within eight cables of an enemy's ship"; the other said, "Ships . . . entering neutral waters . . . are to be out of action for twenty-four hours." As a matter of fact the B Red Fleet violated both these rules. It passed between the Maidens and the Blue Fleets at a time when several ships of the latter were not much more than a mile from the former. It was necessary for it to do this unless it was prepared to fight an action in which the superiority of the Blue forces was overwhelming. Rejecting this alternative as involving certain and decisive defeat, Admiral Dale determined to push his way at all hazards into Belfast, which could be done at the speed at his command in considerably less than the two hours required for a decisive engagement. But it could only be done by treating as non-existent two of the rules laid down by the Admiralty for the conduct of the operations. Whether it could even be done without violating

a more general rule, which declared that "nothing is to be done by any person engaged in the manœuvres which would not be permissible, or likely to be practicable, in time of war," is a question about which great difference of opinion existed at the time and probably still continues to exist.

Decision of umpires.

The B Red Fleet of course reached Belfast in safety, and within the time required to save it from the consequences of a decisive engagement. There was nothing but the rules to stop it, and the rules were either deliberately or inadvertently ignored by Admiral Dale. The Blue Fleets maintained the engagement until Belfast was reached, and here a violation of the rules by the Edinburgh and the Colossus, which approached in pursuit to within less than 6000 yards of the fortifications with which Belfast was supposed to be surrounded, was subsequently adjudged by the umpires to have put those two ships out of action. But the umpires decided at the same time, as was manifestly inevitable, that the previous violation of the two rules above quoted by the whole of the B Red Fleet had put that fleet collectively out of action and rendered it incapable of taking any further part in the operations until twenty-four hours had elapsed. Long before the expiry of that period the A Red Fleet had in its turn been encountered and decisively defeated by the combined Blue Fleets, and the operations were thereby brought to a close.

General action between Blue and Red Fleets.

Having contained the B Red Fleet in Belfast, where, according to his view of the operations, it was bound to remain out of action for twenty-four hours, Admiral Seymour, with the C and D Fleets combined, proceeded to the southward to look out for the A Red Fleet, whose proximity was inferred from the presence of a strong squadron of Red cruisers which were already visible to the southward, and appeared to be waiting at a rendezvous. Soon after 10 A.M the main body of the A Red Fleet was observed apparently making for Belfast, but as the two opposing Fleets came abeam of each other, the A Red Fleet altered course sixteen points, its Commander having apparently observed the B Red Fleet leaving Belfast and rapidly coming up astern of the Blue Fleets. As Admiral FitzRoy could not know what had previously occurred, or that the B Red Fleet had already been claimed as out of action by Admiral Seymour, he had no motive for avoiding an action or rendering it indecisive by taking shelter in Belfast. His junction with the B Red Fleet was practically effected as soon as the latter opened fire within the prescribed distance, and this being so, he had every right to assume that at the close of the two hours required for a decisive action, he would be in a position to claim a decisive victory over the Blue side. His numerical strength was reduced by the absence of the Devastation,

which had been left astern during the night; but this made no difference to his superiority, as the Aurora was absent from the Blue side. Both ships joined their respective sides during the engagement. Having altered course so as to obtain the necessary time and sea room for a decisive engagement, Admiral FitzRoy reduced the speed of his own fleet in order to enable the B Red Fleet to come up, and the engagement lasted for the prescribed two hours. At the close of this time, each admiral claimed a decisive victory over his adversary. As neither claim was beyond dispute, it became evident that the final decision must rest with the umpires, and both admirals agreed to retire to their respective ports and await the result of the umpires' deliberations. The Red Fleets both went to Belfast, the C Blue Fleet to Kingstown, and the D Blue Fleet to Holyhead. The umpires' decision, which was given on Tuesday, August 7th, "was to the effect that the B Fleet, being already out of action, could not be considered a reinforcement of the A Fleet, which therefore was outnumbered by the proportion laid down in the rules. The umpires' decision," continues the official report on the manœuvres here quoted, "did not reach the fleets until after the action had taken place, and the Admiral of the A Fleet, when engaging in it, was not aware that so large a portion of his force as the whole B Fleet, which had actually come into action, was disqualified from giving him effectual support, or, indeed, any support at all."

Victory of Blue side discussed.

Thus by the operation of the rules a complete victory was awarded to the Blue side. Whether in actual warfare—which is governed, not by conventional rules, but by the stern realities of fact and force—the same result would have ensued is a very different question, but it is no very profitable question to discuss. In arranging a plan of campaign in manœuvres each admiral assumes, as a matter of course, that the rules will be observed on both sides, and makes his dispositions accordingly. If his dispositions, made on that hypothesis, are successful, there is nothing more to be said. On any other hypothesis his dispositions might have been quite different, and the result in that case becomes so purely conjectural as to be not worth discussing. It is greatly to be regretted, no doubt, that to all appearance Admiral Dale inadvertently violated the rule about neutral waters. He appears to have regarded the Maidens as non-existent, or at least as immaterial to the situation. On that hypothesis his proceedings were intelligible, and might even be represented as well conceived. Overpowering as was the superiority of the combined Blue Fleets, they were not manifestly in a position, meeting the B Red Fleet where they did, to force it to a decisive engagement, since Belfast could be

reached by the latter in a little more than an hour's steaming. Any action in such circumstances must, therefore, have been indecisive, and apparently without result, according to the rules; so that on this hypothesis Admiral Dale had nothing to lose and not a little to gain by forcing his way into Belfast in the face even of overwhelming odds. Nevertheless the hypothesis appears itself to be radically faulty. If the Maidens had been non-existent, it would have been quite as easy for Admiral Seymour to place himself at the limit of the neutral waters on the adjoining coast of Ireland as it was for him to place himself at the limit of the neutral waters surrounding the Maidens. In that case Admiral Dale, if he persisted in forcing his way into Belfast, must have violated either the rule forbidding entrance to neutral waters, or the rule declaring that no ship is to approach within eight cables of an enemy's ship. In other words, his position was untenable, whether the Maidens were taken into account or not.

The opinion was entertained in some quarters at the time that in actual warfare Admiral Dale would have been fully justified in exposing his fleet as he did to the overwhelming attack of the Blue side for the sake of obtaining the secure shelter of Belfast, and of so crippling the Blue side as to render it an easy prey to the A Red Fleet in the sequel. Such an opinion is far too abstract for profitable discussion. The superiority of the Blue side to the B Red Fleet was, at the time of the engagement (the Aurora being absent),conventionally represented by the proportion of 54 to 32, a superiority of more than 68 per cent. The engagement lasted for fifty-two minutes, from 5.48 to 6.40 A.M. No one can say for certain what amount of mutual damage would be inflicted in the course of an hour's fighting by two fleets, one of which is nearly 70 per cent. stronger than the other. It is probable that the weaker fleet would be destroyed by the overwhelming superiority of its adversary, while the stronger would be materially crippled. But if the conventional strength of the Blue side had been reduced to 36 as the result of the first engagement, it would still have been strong enough to fight a decisive action with the A Red Fleet, whose maximum conventional strength was 32. In other words, the Blue side could have afforded to lose more than 33 per cent. of its original strength as the price of destroying the B Red Fleet without sacrificing its ulterior superiority over the A Red Fleet. These considerations are purely speculative, of course, because the rules made no provision for reducing the conventional strength of any of the fleets as the result of an action, decisive or indecisive. But the whole hypothesis is equally speculative, nor is it mended in that respect by neglecting the conventional

strength assigned to the several fleets and looking at their actual composition. Their actual composition had nothing whatever to do with the matter, being entirely merged for all the purposes of the manœuvres in the conventional strength assigned to them by the rules. In point of fact, all considerations of this order are not only purely speculative, but entirely irrelevant.

Admiral Dale's strategy criticised.

It would seem, then, that Admiral Dale's gallant attempt to force his way into Belfast was, in the circumstances, a disastrous strategical blunder, and this without regard to the fact that his neglect of the Maidens, and their bearing on the situation, was probably merely a technical oversight. Maidens or no Maidens, it was quite impossible for him to reach Belfast without violating the rules. Long after the Maidens were passed, and probably before their bearing on the rules was perceived by either combatant, the Blue admirals exchanged signals in which each expressed his conviction that nothing but the rule of distance, which Admiral Dale had already violated, prevented their cutting off his fleet. The rule in question is that which provided that no ship should approach within eight cables of an enemy's ship. This shows that in the opinion of both the Blue Commanders the Blue Fleets were so disposed as to make it impossible for Admiral Dale to reach Belfast without violating the rules—irrespective of the Maidens and their technical inclusion within neutral territory as defined by the rules. Speaking as an eye-witness of the whole engagement, the present writer has no doubt whatever that this opinion was well founded.

Alternatives open.

It may be thought, perhaps, that Admiral Dale had no other course open to him but that which he actually pursued. But this opinion can hardly be sustained. Admiral Dale was well supplied with fast cruisers. He might, without showing the main body of his fleet, have ascertained by means of his scouts that the Blue Fleets had effected their junction and were rapidly advancing northwards. Possessed of this information, he might have retired into the open outside the North Channel, where his speed would have enabled him to baffle pursuit, and to avoid any action which he could not fight with advantage. In that case two courses would have been open to Admiral Seymour—either to remain on the watch in the North Channel, as he actually intended to do, or to pursue his retreating adversary into the open. The latter course would have cleared the way for Admiral FitzRoy to pass also into the open and to effect a junction with Admiral Dale, and to Admiral Dale himself to try and slip past his adversary back into the Irish Channel. Even the former course might have exposed the united Blue Fleets to a concerted and simultaneous attack from the two Red Fleets

with forces undiminished; and could this combination have been successfully carried out, it would seem that Admiral Seymour had no certain means of answering it. His only chance of success would apparently have been to gain touch of one or other of the attacking fleets by means of his cruisers, and to endeavour to overpower it before his other adversary could come into action. But as both the Red Fleets were superior in speed to his own, it was in the power of whichever of them was attacked first to draw him so far away from the North Channel as to open the passage for the other, and thus to compel him to forego the advantage he had obtained of occupying an interior position. If by this means he could have overpowered one of the Red Fleets, he would have had nothing more to fear from the other. But his situation would have been precarious at the best; he would have been constantly liable to torpedo attack from Belfast, and before the period assigned by the Admiralty to the operations was over, he might have been in serious straits for want of coal. It is true that he had made such provision as was possible in the circumstances for coaling his ships in detail in certain sheltered anchorages outside the limits of forbidden waters; but these anchorages might easily have been discovered and attacked by a vigilant enemy, and the shelter they afforded was in any case none of the best. Thus it appears that Admiral Dale's ill-judged attempt to force his way into Belfast was the direct cause of the discomfiture of the Red side. The attempt was adjudged illegitimate by the umpires on purely technical and perhaps rather unsubstantial grounds. But it was equally disallowed by sound considerations of strategy and tactics. The convention of neutral waters must always wear a certain air of unreality in peace manœuvres. But there is no sort of convention in the fact that a ship or fleet cannot approach nearer to the land than the depth of water allows. Had there been no neutral limit, it was entirely within Admiral Seymour's power so to dispose his fleet in relation to the adjacent coast of Ireland as to make it impossible for Admiral Dale to pass it without either going ashore or coming within eight cables of one or more of the opposing ships. This being so, it seems indisputable that Admiral Dale was rightly adjudged to have failed in an attempt which was not only conventionally illegitimate, but strategically unwise and tactically impossible. Had he, on the other hand, retreated into the open on first obtaining certain information of the junction of the Blue Fleets, he would indeed have allowed Admiral Seymour to score the first trick; but he might, and probably would, have enabled Admiral FitzRoy to win the game in the end. As it was, he may be said to have revoked, and, as usually happens in the game from which the

metaphor is taken, he probably did so unconsciously. But the penalty was exacted, and it gave his adversary the game.

Pursuing the same metaphor, it may further be pointed out that Admiral FitzRoy's first lead was not, as the sequel showed, a very happy one. The first action of the morning of August 5 terminated at 6.40 A.M. The second action began at 10.30, less than four hours later. Had, therefore, the A Red Fleet been six hours in advance of its actual position when the second action began, it would have been in time to join hands with the B Red Fleet before the latter could have been overpowered by the combined Blue Fleets. Now the distance by the shortest course from the original starting-point of the A Red Fleet, in latitude 48° 30′ N., longitude 6° 30′ W., to a point some miles to the northward of that where the B Red Fleet encountered the combined Blue Fleets is about 390 miles, and this point could therefore have been reached by the A Red Fleet at a speed of 15 knots in 26 hours, or at 11 P.M. on the night of August 4. It is true that Admiral FitzRoy could not have maintained this speed throughout without abandoning the Devastation, and thereby surrendering his superiority over the combined Blue Fleets. But the calculation shows that the critical point could have been reached at no extreme speed, with no greater risk of defeat than Admiral FitzRoy actually ran, and with a liberal allowance for delay in ascertaining that the southern entrance to the Irish Channel had been left unguarded by the Blue Commander, before the time —5.48 A.M. on August 5—at which the first action began. It is true that, if Admiral FitzRoy had adopted this course, he would have run the risk of overtaking Admiral Seymour and exposing his fleet to decisive defeat. But his speed would have enabled him to avoid an engagement, and if he had drawn off either, or both, of the Blue Fleets in pursuit, he would have enabled Admiral Dale to reach Belfast unmolested. In the other alternative, that of keeping sufficiently in rear of Admiral Seymour to avoid encountering the latter prematurely, he had a fair prospect of joining hands with Admiral Dale before the first action was decided, and could in any case have reached Belfast in safety. But he seems to have assumed from the outset that Admiral Seymour would take up his position at the southern entrance to the Irish Channel, and he made his own dispositions on that assumption. The assumption proved to be unfounded, and hence his dispositions failed; though had it been otherwise, they were certainly judicious and well-conceived. Admiral Seymour, on the other hand, assumed that this assumption was exactly what Admiral FitzRoy would make, and resolved to frustrate it by not acting on it himself. The credit of the truer divination belongs, in

Admiral FitzRoy's strategy discussed.

this case, to the Blue Commander, but the uncertainties of naval warfare can hardly be better illustrated than by the fact that the whole issue of the operations might have been different, and the evenly-balanced chances might have inclined in favour of the side that was actually beaten, if a few hours had not been wasted at the outset by the Red Commander, in pursuance of an assumption that was perfectly legitimate, and even probable in itself, though, as a matter of fact, it was totally devoid of foundation. It is perhaps worth while to recall in this connection the significant words of two of the greatest of seamen. Drake wrote, more than three hundred years ago, "The advantage of time and place in all martial actions is half a victory; which being lost is irrecoverable." "Time is everything," said Nelson; "five minutes makes the difference between victory and defeat."

Torpedo-boat operations.

On the torpedo-boat operations of the manœuvres the official report makes the following comment:—

"No ship was put out of action by a torpedo-boat. The lightness of the nights seems to have had a twofold effect. No. 80 (Red side) in evading a 'catcher' at first missed the Blue Fleet, but managed to keep up with it, and got within range of the rear ship, which was not attacked because she was supposed to belong to Group 3, a class exempted from torpedo attack by the rules. The light apparently was not sufficient to permit the real character of the ship to be ascertained. On the other hand, it is reported that the nights were never really dark enough to afford concealment to the torpedo-boats. The torpedo lieutenant in command of No. 80 makes the interesting observation that, owing to the speed of the 'hostile' fleet, the boats were unable to regain their position for attack when once it had been lost. From this it seems permissible to infer that high speed will be of itself no unimportant protection to ships traversing at night narrow waters infested by torpedo-boats. The torpedo-boat operations were upon a too restricted scale to supply much valuable instruction; but, as far as they went, they tend to confirm the view that the most effective employment of the torpedo-boat in war will be limited to sending her to attack an enemy's ship in a known position within the boat's range of action, and that the whereabouts of the enemy must be first ascertained and be communicated to the commander of the boat. The necessity of combining with torpedo-boats vessels of other and larger classes to scout and discover the enemy—where exact information as to his position cannot be obtained by other means—seems to be established, and, if so, it carries with it the obligation to consider a mere flotilla of torpedo-boats by themselves as a belligerent factor of distinctly imperfect efficiency."

The Kingstown torpedo-boats.

These remarks may be supplemented by the narrative of an episode which occurred in the Irish Channel on the morning of August 5th. At the outset of hostilities, Admiral Seymour had transferred a division of torpedo-boats from Queenstown to Kingstown, considering the former port to be too far removed from the probable scene of operations for effective action. On passing Carnsore Point on August 4th, he received information from the signal station that three cruisers had passed Black Sod Bay at 8 A.M., and as they had not answered the challenge, it was inferred that they belonged to the B Red Fleet. Accordingly, the Queenstown division of torpedo-boats received orders in the course of the day to look out for these cruisers during the ensuing night. The result and its lessons are indicated as follows by one of the correspondents of the *Times*:—"Here was a case in which the torpedo-boats had a definite object to look for and a definite place in which to look for it. They found three cruisers, and, not receiving or failing to understand the private signal, they forthwith proceeded to attack them. Unfortunately, the three cruisers in question turned out to be the Warspite, Australia, and Galatea, belonging to Admiral Drummond's"—that is, the D Blue—"Fleet, and, though no ship was torpedoed, two out of the three torpedo-boats were put out of action, the third having previously gone astray. Two points are here to be noted—one, that the torpedo-boats were operating not at random, but in pursuit of a definite object, namely, three enemy's ships, whose probable position and course were approximately indicated to them beforehand; the other, that after all the object they found was not the object they sought, but three friendly ships whose destruction, had it been accomplished, would have inflicted irreparable loss on their own side. This very awkward habit of mistaking a friend for a foe is one which has often before been exhibited in manœuvres by torpedo-boats. It is less likely to occur in actual warfare, because nearly all foreign ships differ very widely in external appearance from any of our own; but its occurrence is regarded by many authorities as sufficiently probable to require that English torpedo-boats should always make the private signal before proceeding to extremities. This means, of course, that English torpedo-boats will never be able to attack except under the most unfavourable conditions—conditions so unfavourable, indeed, as almost to ensure their destruction. But those who take this view regard it as a logical deduction from Lord George Hamilton's dictum that the torpedo-boat is essentially the weapon of the weaker combatant. So regarding it, they also regard the almost certain destruction of an English torpedo-boat by an enemy as of less moment to England than the possible destruction of an English

battleship by a friend; and they consider that the best way to avert such a catastrophe as the latter is to require the torpedo-boat to declare itself by making the private signal in all cases which leave room for more than a shadow of a doubt. These views are new to me, as they will be to many of your readers, who will perhaps be not a little surprised to learn that they are held by professed advocates of torpedo-boats. They seem to place the strategic value of the torpedo-boat for English purposes even lower than some of its most severe critics have ever ventured to place it; and it is certainly not a little remarkable that they should be entertained at a time when some high authorities are beginning to doubt whether the position even of the battleship in the naval warfare of the future is not beginning to be imperilled by the development of vessels of the Havock and Hornet class, regarded as sea-keeping torpedo-boats, which might in favourable circumstances attack even in the daytime, or, having found their enemy in the daytime, might hover round out of range and attack in large numbers after dark."

Influence of the torpedo-boat in naval operations.

These conclusions are strongly enforced by the general history of the torpedo-boat operations of the manœuvres of 1894. The attack of the Red torpedo-boats on the D Blue Fleet failed altogether. The Blue torpedo-boats on the same night seem to have made no attack whatever on the A Red Fleet, which from midnight to daylight on the morning of August 5 can hardly have been at any time much more than fifteen miles from the Blue territory on the east coast of Ireland; and so little did Admiral FitzRoy fear their attacks, that having extinguished his lights, he ordered, according to the official report, that "no firing was to take place at torpedo-boats. The catchers were to drive them off and return to their station." The result is in part attributed in the official report to "the lightness of the nights." Now, as a matter of fact, the night in question was not a light one. The moon, which had not reached its first quarter, set on August 4th soon after 9 P.M.; and according to the correspondent above quoted, "the night, though fairly clear, was very dark. A ship without lights could hardly have been seen at all from the deck of a torpedo-boat at a distance of more than 300 yards." Hence it seems almost to be demonstrated that, except on the conditions clearly defined in the passage quoted above from the official report, the torpedo-boat must be regarded as almost *une quantité négligeable* in the conflict of sea-going fleets. This demonstration does not rest merely on the very limited, but singularly instructive, experience of 1894. It is the logical sequel to the conclusions established by the far more extended and varied experience of previous years. It was pointed out in the *Naval Annual* for 1894 that "the con-

tinuous experience of three years' manœuvres, those of 1891, 1892, and 1893, would seem to show that the sea-going torpedo-boat is an over-rated weapon of offence. In 1891 the late Admiral Long showed that an active defence, adequately organised and skilfully disposed, must in the end completely neutralise the offensive capacity of the torpedo-boat. This demonstration was reinforced by the manœuvres of 1892, which also showed further that the extinction of the torpedo-boat menace follows immediately on the destruction of the shelter provided for the hostile torpedo-boats and on the surrender of the sea-going squadron to which they are attached as auxiliaries. Lastly, the manœuvres of 1893 completed the demonstration by showing that, even in default of an active defence adequately organised and skilfully disposed, torpedo-boats are very apt to suppress themselves and to attain a very high rate of extinction in the normal course of their attacks on a powerful and vigilant sea-going adversary." To this continuous demonstration the manœuvres of 1894 have added something like a proof that the torpedo-boat, unaided, is very unlikely to find the enemy, and, if his speed is at all considerable, is very often unable to catch him when found. If it be added that its power of distinguishing a friend from a foe is very limited, the conclusion seems to be irresistible that the torpedo-boat, however formidable as a menace, is singularly impotent for decisive effect.

Torpedo-catchers.

On the other hand, it must be acknowledged that the catchers, and cruisers employed as catchers, were not much more effective than the torpedo-boats. On the night of August 4, Admiral Drummond detached the Apollo, Naiad, Sybille, and Hebe, "to endeavour to catch torpedo-boats returning to Belfast." They seem to have been altogether unsuccessful in this enterprise, probably because the attack of the Red torpedo-boats on the D Blue Fleet was delivered before midnight, and the torpedo-boats were able to return to Belfast during the darkest hours of the night. The catchers attached to the A Red Fleet seem to have been as unsuccessful in finding the Blue torpedo-boats as the latter were in finding the ships of the fleet. It appears, indeed, to have been Admiral FitzRoy's policy not to hunt the torpedo-boats with his catchers, but to retain the latter in company, and rely on them to drive off the torpedo-boats if, and when, they appeared. The policy is perhaps a hazardous one, if the torpedo-boat is really as formidable as some of its advocates have represented it to be. Its success on the occasion in question is no proof of its tactical merit. As the torpedo-boats never appeared, the catchers were never required to drive them off; it does not follow that they would have been able to drive them off if they had appeared.

Scouting.

One subsidiary but very important point in the history of the manœuvres still demands a few words of comment. It will be observed that very little use was made of cruisers for scouting purposes on either side. The official report shows that at the outset of the operations Admiral Dale employed some of his cruisers to gain touch with the D Blue Fleet, and was fairly well informed as to its movements. But with this exception the cruisers on both sides were for the most part kept well in hand, and employed rather to maintain the conventional strength of the fleets to which they were attached than to increase the strategical information of those fleets by gathering information concerning the enemy's movements. Admiral FitzRoy's cruisers in particular were sent ahead, not to scout, but, if possible, to deceive the enemy and to decoy him away from the position he was assumed to have occupied, and in the sequel to reinforce the B Red Fleet as soon as possible. The explanation of this is that the conventional strength of the two sides was so evenly balanced that neither could part with its cruisers without running the risk of being taken at a disadvantage by the enemy. It is moreover probable that in actual warfare a naval commander will never detach from his fleet any ship that is in any way capable of holding its own in the line of battle, or of contributing in any material degree to his effective fighting strength. For the purpose of scouting, a purpose which in actual warfare is of paramount importance, he will probably employ some of the faster vessels of the mercantile marine—vessels of little offensive capacity, but of very high speed, and of immense coal capacity if the whole of their available tonnage is devoted to the stowage of coal. Such vessels would be readily available in war, as some few of them would, at the outbreak of war, probably be withdrawn from their regular employment. It would be less easy to employ them for the purpose of manœuvres, but it is also less necessary to do so. Their place in manœuvres could be very adequately supplied by attaching a certain number of second-class cruisers to each side, and determining their function as scouts and nothing else by giving them no value as fighting units. If this were done, no admiral would be under the temptation, which in any other circumstances is too strong to be resisted, of neglecting scouting for the sake of maintaining a superiority over his adversary. There was very little room for sustained scouting in the brief manœuvres of 1894. But there is no branch of manœuvre practice which is more important and more instructive in itself, or less hampered by artificial conditions in time of peace. It seems, therefore, to be worth while to encourage its study to the utmost, and so to arrange matters for its prosecution that no admiral should be

under any temptation to neglect it for the sake of maintaining what is, after all, a purely conventional standard of relative strength.

JAMES R. THURSFIELD.

NOTE.—The foreign manœuvres of 1894 appear to have been for the most part rather of an evolutionary than of a strategical character. The French manœuvres, in particular, consisted of a series of exercises well designed for instruction and training, but scarcely of sufficient novelty and importance to invite detailed comment. For this reason the present volume of the *Naval Annual* contains no chapter on foreign manœuvres. But as the writer of the chapter on foreign manœuvres in last year's *Naval Annual* was inadvertently betrayed into a misstatement of fact concerning the proceedings of Admiral Vignes during the French Mediterranean manœuvres of 1893, it is due to that distinguished officer to reproduce here a letter addressed to Lord Brassey by the writer of the chapter, for the purpose of correcting his involuntary mistake. This letter was printed in the *Times* of July 14th, 1894, and is as follows:—

DEAR LORD BRASSEY,

It has come to my knowledge that, in the account of the French naval manœuvres which I contributed to the *Naval Annual* for 1894, I have, quite involuntarily, done some injustice to a distinguished French naval officer.

In commenting on certain operations conducted by Admiral Vignes in the Mediterranean, I stated, on p. 76 of the *Naval Annual*, that, although Admiral Vignes was in favour of line ahead, he "adopted a different formation, that of columns of divisions line ahead, for the purpose of meeting an anticipated torpedo-boat attack." This statement is founded on a passage previously quoted, p. 73, from a *précis* of the operations contributed by Commander Garbett, R.N., to the Journal of the Royal United Service Institution for October 15th, 1893. That passage is as follows:—"After dark the ships proceeded without lights . . . . the ships being in two columns in line ahead, and thus covering a good deal of ground." In a subsequent passage Commander Garbett records that "the ships opened fire, but, it is stated, very much at random, and recklessly with regard to the positions of each other."

Commander Garbett states in the journal that his narrative was "prepared by permission from the special correspondence of the *Temps*, and from the *Marine de France*, and other sources." There-

fore, the responsibility for any statement of fact which appeared in Commander Garbett's narrative and was reproduced by me in the *Naval Annual* properly rests, not with myself nor with Commander Garbett, but with the French writers from whom Commander Garbett derived his information.

It appears that these writers were misinformed about the facts in question. Through the courtesy of Captain Egerton, R.N., the British Naval Attaché at Paris, I have had the privilege of reading a communication addressed by Admiral Vignes to that officer in reply to an explanation which, when the matter was brought to my notice, I addressed, through Captain Egerton, to Admiral Vignes. Admiral Vignes writes as follows:—

"Mes souvenirs, mon journal de bord, disent que le 7 Juillet, 1893, à midi et demi l'escadre active a appareillé du Golfe Jouan, l'escadre de réserve a appareillé de Villefranche. Elles ont opéré leur jonction à trois heures après-midi, ont fait quelques évolutions et, le soir, avant la nuit, se sont formées *en une seule ligne de file*, qu'elles ont conservée pendant toute la nuit, changeant de route sans signal. Il n'y a aucun doute, l'assertion de la page 73 du *Naval Annual*, 'The ships being in two columns in line ahead,' est erronée. Tous les bâtiments présents *étaient sur une seule ligne de file*, qu'ils ont conservée pendant toute la nuit. Cette erreur primordiale fausse naturellement les déductions et les raisonnements qui suivent."

This very explicit and authoritative statement makes it clear that my statement was unfounded in fact, though it appeared to be justified by the authorities to which I specifically referred; and, the statement itself being unfounded, it follows as a matter of course that all inferences from and comments upon it must be regarded as cancelled.

With a courtesy towards myself for which I am extremely grateful, and with a compliment to the *Naval Annual* which I am sure you will appreciate not less highly, Admiral Vignes adds: "Je vous prie de bien répéter à M. James R. Thursfield que je ne le rends responsable de rien, et que je ne vous aurais pas parlé de ce fait si le *Naval Annual* ne jouissait partout d'une réputation de bonne information et d'intégrité parfaite."

It is only just to Admiral Vignes that you should be informed of the error into which I have been involuntarily drawn, and for which, as far as I can be held responsible for it, I desire to express my sincere regret to you, as I have already done to him. I wish it were possible to correct the statement as publicly as it was made, and to ask all readers of the *Naval Annual* to draw a pen through every passage in which it is stated that Admiral Vignes adopted the formation of

"columns of divisions line ahead" on the occasion in question, and, further, to cancel all comments founded on that statement.

I need hardly say that if you think proper to make this letter public in any way I should welcome the opportunity of redressing the injustice which I have, quite involuntarily, done to Admiral Vignes, and of acknowledging his great courtesy and consideration.

I am, dear Lord Brassey,

Very faithfully yours,

JAMES R. THURSFIELD.

CHAPTER V.

The Naval War between China and Japan.*

Concerning the causes of the quarrel which in July, 1894, led to hostilities, followed on August 1st by a formal declaration of war, between Japan and China, nothing need here be said. A rupture had for some time been inevitable upon the question of Corea. Nor is this the place for any description of the operations of the war on land, save so far as they were carried out with the direct assistance of ships and vessels. My mission is simply to trace the progress of events by sea. The day has not yet arrived when this can be done with all desirable minuteness, or even with absolute accuracy; yet, thanks to the valuable help furnished me from well-informed quarters, to photographs which have been sent me from the scene of action—some taken actually under fire—and to a very careful perusal and comparison of all printed accounts of the events in the Yellow Sea upon which I have been able to lay hands, I hope to give as complete and detailed a narrative of the course of the naval portion of the war as can be compiled, pending the preparation by the Japanese Admiralty of the full official history, which will no doubt be one day published to the world.

The rival Navies.

The Navies of both China and Japan had for many years enjoyed the advantages of European, and especially of British and German, influence. In the Chinese service this influence continued up to the very outbreak of the war, although the European officers in Chinese ships and dockyards had long since begun to feel

* Authorities:—Notes, special information, and translations of official documents kindly supplied to me by Captain K. Yendo, Imperial Japanese Naval Attaché in London; notes, sworn statements, and reports of Herr von Hanneken (who was on board the Kowshing when she was sunk, and on board the Ting Yuen at the battle of Hai-yun-tau), Commander McGiffen (of the Chen Yuen), and various officers of the Kowshing; official despatches to the German Admiralty of Commander Graf von Baudissin (of the Iltis); private letters from British and other officers on the China Station; the account of the battle of Hai-yun-tau in the *Marine Rundschau* for February, 1895: a volume devoted to the same action by Mr. Jukichi Inouye, richly illustrated with photographs by Mr. K. Ogawa, and published at Yokohama; special correspondents' letters in the daily papers, English, American, French, and German; two studies by Signor C. Avallone in the *Rivista Marittima*; and papers in *Le Yacht*, the *Militär-Wochenblatt*, *Neue Militärische Blätter*, *Tidskrift for Sövaesen*, *Le Moniteur de la Flotte*, *Tidskrift i Sjöväsendet*, and other foreign technical publications. I have also utilised my own study of the progress of the war in *Blackwood's Magazine* for February, 1895.

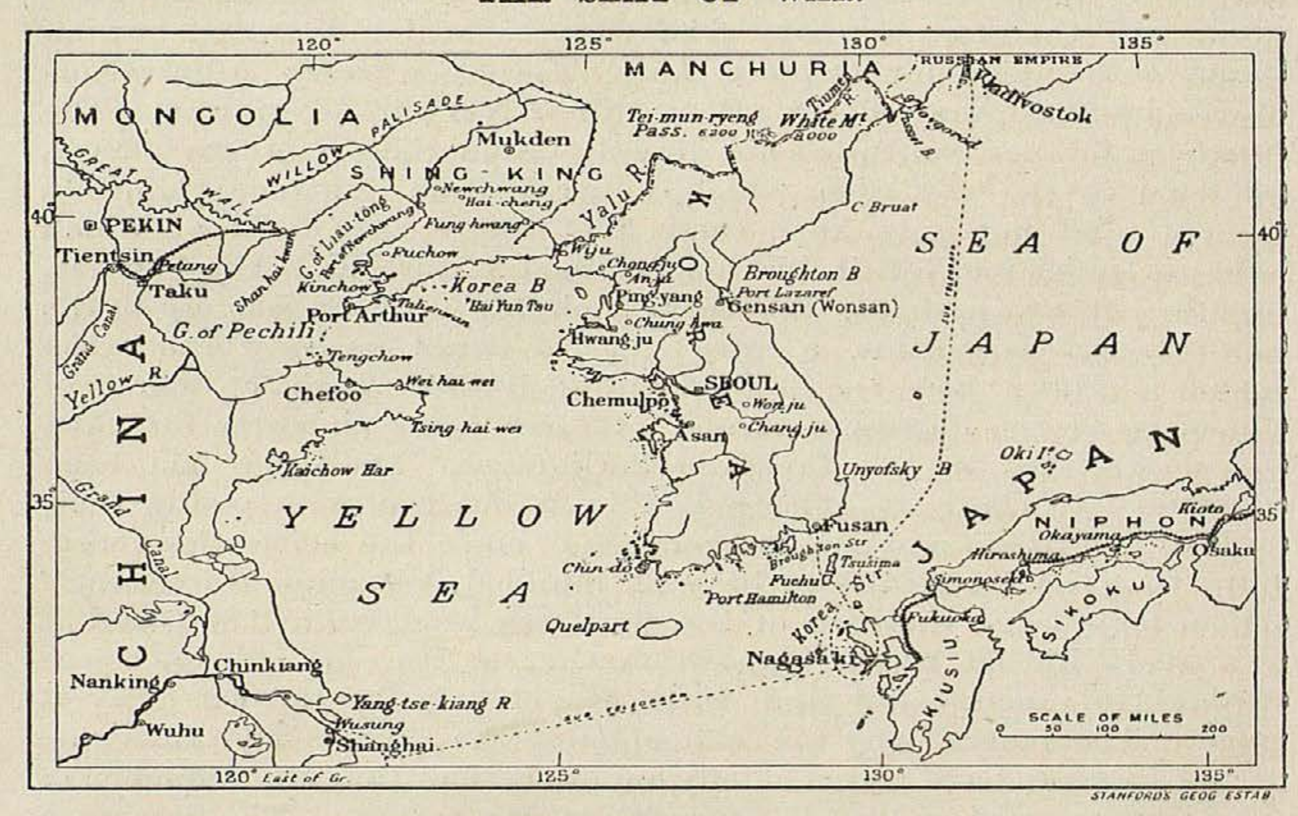
that, owing to Chinese apathy, corruption, and perverse conservatism, their position was scarcely tenable; and many of them, including Captain W. M. Lang, R.N., had already been driven to resign. In the Japanese service, where the Europeans had had no such difficulties to contend with, and where the West had found occasion only to wonder at the marvellous aptitude and progress of the East, this influence, so far as it was directly exercised, had become unnecessary, the Japanese having profited to the utmost by their tutelage, and justly considering themselves to be capable of walking alone. Captain John Ingles, R.N., the last British naval adviser to their Government, after having done exceedingly good work, had therefore retired. The Chinese, still influenced, but no longer controlled—for Captain Lang had been their Admiral-in-Chief—by European officers, allowed their Navy to deteriorate. The Japanese, neither controlled nor directly influenced by foreign officers, persisted in the way upon which, under British guidance, they had set out, and not only kept their fleet up to the mark at which Captain Ingles had left it, but also carried it further. Yet even in Japan—except, perhaps, in "service circles"—there was, up to the beginning of hostilities, a very general doubt as to whether the Japanese Navy had reached anything like so high a degree of efficiency as the Japanese Army. It had been violently attacked and depreciated in the Japanese Parliament. Its ships had been adversely criticised, its officers had been charged with owing their rank to favoritism and not to merit, and, since the accusations were more than half believed to be well founded, Viscount Kabayama's appeal for a large increase of the fleet was rejected in 1890, and it was freely hinted by the Opposition that, so long as efficiency was so doubtful, money for more ships would only be thrown away if voted. The reason why the efficiency of the officers was thus suspected seems to have arisen chiefly out of the fact that the influence of the Satsumas was and is all-powerful in the service. The Satsumas and their retainers were ever brave, even beyond rashness, but they had no reputation for scientific knowledge and for cool judgment. Nor have the Japanese of the past been great seamen. And thus, few, either in Japan or elsewhere, expected the Japanese Navy to work with the precision and unity which have uniformly distinguished its operations in this campaign. The triumphs of the Army have caused no surprise in Japan: the brilliant success of the Navy has caused not only delight but astonishment as well. Gallantry was expected, science and skill were not. Yet they have been equally displayed.

In June, 1894, the Chinese having sent troops to Corea to put

The Landing at Chemulpo.

down a rebellion, Japan landed a party from some men-of-war upon the coast, and speedily followed up this step by quietly transporting and setting ashore at Chemulpo, the port of Söul, a mixed force of 7600 horse, foot, and artillery, which, leaving a detachment at Chemulpo, proceeded to occupy Söul, and dispatched northward a division to bar the approach by land of further Chinese troops. Fearful of losing her hold upon Corea, yet perhaps anxious not to provoke a collision prematurely, China chartered three British steamers, the Irene, Feiching, and Kowshing,* loaded them with

THE SEAT OF WAR.



soldiers and stores, and dispatched them from Taku to Asan, a few miles to the southward of Chemulpo. The Irene left on July 21st, and arrived early on the morning of the 24th. The Feiching left on the 22nd. In the Kowshing, Captain Galsworthy, went Herr von Hanneken, a Prussian ex-officer in the Chinese service. His account, subsequently sworn to before Mr. Wilkinson, British Vice-Consul at Chemulpo, was to the following effect:—

"The steamer Kowshing left Taku on July 23rd, with 1200 men

* The Kowshing, iron screw steamer of 1355 tons net, and 241 horse-power nominal, was built at Barrow in 1883, and was 250 ft. long by 39 ft. 2-in. broad. She had five bulkheads, and was schooner rigged.

and twelve guns, as well as small arms and ammunition, on board, and, on the morning of July 25th, sighted the islands of the Corean Archipelago lying off Prince Jerome Gulf. At that time, on the port side, was seen a large warship, steaming rapidly westward in the general direction of Port Arthur, and apparently resembling the Chinese battleship Chen Yuen. She passed, and was not again sighted. At about 7 A.M., on the starboard side, was seen a vessel under sail, heading towards Chemulpo in such a manner that, if she kept on her course, she must cross that of the Kowshing, as the latter steered for Asan. At about 8 A.M. a large man-of-war was discovered coming out from behind the island of Hsutan, and ten minutes later a second was seen, then a third, and then a fourth. So far as could be judged from the Kowshing, all were big ironclads. Towards 9 A.M. it could be distinguished that the nearest vessel flew the Japanese ensign, with a white flag above it. She rapidly approached the Kowshing, and, passing, saluted by dipping her ensign. At that moment the four Japanese vessels, heading almost west, were nearly in line abreast, and the Kowshing, heading in the opposite direction, was in line with them, between the most northerly one (the one with the white flag) and her next abeam. The vessel which had been previously observed under sail, and which was later known to be the Chinese despatch-boat Tzan Chieng, had turned, and was farther to the westward, heading for Wei-hai-wei. It looked as if the Japanese meant no harm to the Kowshing, but were in chase of the despatch-boat. The Japanese, in fact, continued their course, tailing out somewhat, until eventually the vessel (she was the Naniwa) which had passed the Kowshing on the latter's starboard hand hoisted a signal and fired two blank shots at the British steamer as an injunction to stop and drop anchor. This injunction was obeyed. The next signal was, 'Remain where you are or take the consequences.' The war-ship in question then went round to port, and approached in turn the two war-ships, which, in the first instance, had been in line with her on her port hand. The three vessels appeared to hold converse by means of the semaphore. Presently the Naniwa circled, and, with all her guns cleared, loaded, and aimed, steamed to within about a quarter of a mile of the Kowshing, and lowered a boat. In the meantime the commanders of the Chinese troops in the transport begged Herr von Hanneken to inform the captain that they would rather go down where they were than be taken prisoners. They were greatly excited, and Herr von Hanneken with difficulty calmed them, and made them understand how important it was to maintain order. He then communicated to Captain Galsworthy, of the Kowshing, what he had heard. The Japanese

Sinking of the Kowshing.

boat having come alongside, several officers from her boarded the Kowshing. The men on the thwarts had rifles and cutlasses. The officers proceeded to the captain's cabin, looked at his papers, and saw the proofs that his was a British ship. They then politely asked him to follow the Japanese man-of-war. Captain Galsworthy and Herr von Hanneken had previously agreed to press that the ship should be allowed to return to Taku, whence she had sailed conscious of no declaration of war; but the Japanese seem to have given the captain no time or opportunity for discussion. In the meantime Herr von Hanneken, on deck, was doing his best to pacify the Chinese, and he only learnt the result of the conversation after the Japanese officers had quitted the ship. As soon as the news was conveyed to the Chinese commanders, they and their troops became violently excited, and with sword and rifle threatened the captain, the crew, and all the Europeans on board in case any one should dare to order the anchor to be weighed. Again Herr von Hanneken had to intervene. He suggested to the captain to signal requesting the boat to return. This signal was made, the boat came back, and Herr von Hanneken, who feared the consequences of the Japanese coming on board while the Chinese were so furious, himself went to the gangway. He explained that the captain's hands were tied, and that he was not in a position to obey the order, seeing that the troops on board would not permit him to do so. He therefore proposed to return to the port whence he had come while yet there was no declaration of war. When Herr von Hanneken had convinced himself that the Japanese officer understood him, the officer departed, saying that he would report the matter to his superior. Some time elapsed. The next signal hoisted was, 'Quit the ship as quickly as possible.' This could apply only to the Europeans and the ship's company; but it could not be obeyed, the Chinese soldiers swarming at the davits. Captain Galsworthy signalled, 'We cannot.' The Japanese intimated that they had understood. Thereupon the Naniwa began to move and to circle round the Kowshing. At a distance from her of about 500 feet, and when broad on her port-beam, the Naniwa stopped, discharged a torpedo, and at once opened fire from all the five guns that would bear. They were discharged twice before the torpedo reached its mark. It hit the Kowshing amidships, apparently over a coal-bunker. 'The day became night: pieces of coal, splinters, and water filled the air: then, I believe, all of us leapt overboard and swam.' The ship was sinking stern first, but the firing continued, and was courageously answered by the Chinese. Captain von Hanneken saw a heavily armed Japanese boat lowered. The people in it fired more rapidly than ever upon the defenders of

the sinking Kowshing. Both the Chinese and the people in the Japanese ship fired also upon those struggling in the water. Half an hour after the Kowshing had been torpedoed she went down. In the opinion of Herr von Hanneken the vessel might have been saved had the original command to remain been disobeyed, or had the anchor been weighed, and some ruse been employed to assist the escape of the ship among the islands. But the captain and his officers had unbounded faith in the protection of the British flag."

The fate of the survivors.

Herr von Hanneken's account has not been contradicted in any important particular, though as regards certain details there were differences of opinion among his fellow-survivors. Of these something will be said later. After four or five hours' swimming Herr von Hanneken reached the island of Shopajul, whence, by fishing boat, he went on to the island of Tak Shan, and so to Chemulpo. At Tak Shan he found 220 Chinese who had managed to save themselves. The German corvette Iltis proceeded thither and took off as many of them, including several wounded, as could conveniently be found room for. Numbers, Commander Graf von Bandissin reports, were almost entirely naked. The injured men when operated upon bore their sufferings without betraying any of the ordinary symptoms of pain. One man asserted that, after the Kowshing had sunk, he and ten or fifteen others got into a boat left floating in the water, and that the group was then fired at, especially from the tops of the Japanese ship, until all in the boat were either killed or wounded. The witness, who had received a shot in the breast, saved himself by swimming when the riddled boat at length foundered. The firing upon the men in the water has nevertheless been denied by the Japanese. I am afraid, however, that it is a well-established fact. Mr. Lewis H. Tamplin, first officer of the Kowshing—who by the way thinks that the Naniwa's torpedo missed, and that his ship was sunk by gun-fire—declares that while he was swimming "bullets began to strike the water on every side, and, turning to see whence they came, I saw that the Chinese, herding round the only part of the Kowshing that was then out of the water, were firing at us. . . . I swam straight for the Naniwa. I had been in the water nearly an hour when I was picked up by one of the Naniwa's boats. . . There were two lifeboats crowded with soldiers. The Japanese officer informed me that he had been ordered by signal from the Naniwa to sink these boats. I remonstrated, but he fired two volleys from the cutter, turned back, and steamed for the Naniwa. No attempt was made to rescue the Chinese. . . . The Naniwa steamed about until 8 P.M., but did not pick up any other Europeans." In an interview with Reuter's agent, Mr. Tamplin also said that, while swimming, he

had passed the Naniwa's unexploded torpedo, and that, as his ship went down, her boiler exploded. Captain Galsworthy, very exhausted, and the Kowshing's quartermaster, were a little later picked up by boats from the Naniwa, which on the following day transferred the prisoners to the Japanese cruiser Yayeyama, Captain Shibyama, to be conveyed to Sasebo, where they arrived on July 28th. Throughout the period of their detention they were very well treated.

The action off Asan.*

The prisoners in the Naniwa found that a shell had entered that vessel's wardroom, where, however, it had not exploded. This shell had not, of course, been fired from the Kowshing, which had no guns mounted. It was a reminiscence of an action which had been fought still earlier in the morning, nearer to Asan, by the Naniwa, Yoshino, Akitsusu, and a fourth vessel, probably the Takachiho (the whole forming the Flying Squadron under Rear-Admiral Tsuboi), with the Chinese ironclad Tsi Yuen,† the cruiser Kuang Yi,‡ and the paddle despatch-boat Tzan Chieng.§ The vessel which Herr von Hanneken, in the Kowshing, had passed steaming westward in the direction of Port Arthur was not, as he supposed, the Chen Yuen, but the Tsi Yuen, in full flight. Mr. Tamplin mentions that he noticed at the time that she had evidently been recently in action. It is strange, yet perhaps not inconsistent with the Chinese character, that, knowing an enemy to be in force ahead of the Kowshing, her captain did not report the fact to Captain Galsworthy. On the other hand, the Tsi Yuen may not have suspected that the Kowshing had Chinese troops on board, and may have supposed that she was an ordinary British trader. The fact, however, remains that if either the Tsi Yuen or the Tzan Chieng, which, it will be remembered, had also been passed, and had been recognised, had made a warning signal, the Kowshing would have been spared her terrible fate.

The history of this earlier action is as follows. On that morning, July 25th, the Tsi Yuen, Kuang Yi, and Tzan Chieng, which had been at anchor off Asan, at the head of Prince Jerome Gulf, weighed and proceeded seaward. Not long afterwards the Yoshino, Naniwa, and Akitsusu (the Takachiho apparently being at the moment away

* Alternatively known as that of Toyoshima, from the Japanese name of an island near the spot.

† See the table of ships present at the Battle of Hai-yun-tau, p. 102. At this time, however, she had no quick-firing guns.

‡ This vessel's name appears in different reports as Kuang ki, Kong Yi, Kwong Chei, Kwang Kai, Kwangyi, &c. I take her to have been one of three sister ships of 1000 tons displacement, and 2400 indicated horse-power, built at Foo-chow in 1890–91, and carrying one 4·7-in. Q.-F., together with either one 6-in. or 4·4-in. B.-L., 8 machine guns, and 4 torpedo-tubes. Her nominal speed of 16·5 knots was probably never attained within 4 knots at least. She belonged to the Canton flotilla.

§ An iron steamer, purchased some years previously from the commercial marine, armed with 3 small guns.

from the Flying Squadron) fell in with them, and, to the surprise of the unprepared Chinese, opened fire. The latter were not cleared for action, and consequently could not at once reply, and, ere they were able to do so, they received considerable damage. At the moment of the commencement of the fight the captain, the first lieutenant, and a sub-lieutenant of the Tsi Yuen, were in the forward conning tower. The enemy's first broadside struck this, destroyed both engine-room telegraphs, the steam steering-wheel, and the voice-tubes leading below, and killed the first lieutenant and the sub-lieutenant, leaving the head of the former hanging on the end of one of the voice-pipes. Not until this had happened did the captain, leaving the conning tower, order the ship to be cleared. He went to the hand-steering wheel. A second broadside struck the ship on the port beam, smashing the steam pipe of the steering engine, so that the vessel became for a time unmanageable. The captain endeavoured to make temporary provision, but the necessary tackles were among the boatswain's stores, and could not be got at without much delay. Exactly what happened during this period can never be known, for no officer who was on deck at the time remains alive; but the men, it seems, had in the interval gone to quarters, the gunnery lieutenant being in the turret forward, and the torpedo lieutenant in the torpedo room. Soon afterwards the forward turret received a shell which, glancing upwards from below, went through the turret wall without bursting. This projectile practically deprived the turret of half its usefulness, as it damaged the deck in such a manner as to prevent one shot-hoist from being worked. It is true that the necessary shells, of only 8·2-in. calibre, and weighing no more than 217 lbs.,* might have been brought to the breech of the right gun by hand, but this did not suggest itself to the Chinese, and that gun, though itself intact, was fired no more that day. A little later another projectile entered the turret from the port side, and, bursting, killed the gunnery officer and four men; yet still both guns remained undamaged. Indeed, the left gun was subsequently fired eleven times. During all this period the Tsi Yuen, especially on the port side, suffered badly. A single shell tore an immense hole in the plating and wrecked three officers' cabins; another shell, a 6-in. one, presently entered through the same hole, but, passing into some clothes presses on the starboard side, did not burst. Later a Chinese officer found the projectile and unloaded it. That it did not completely traverse the ship seems to indicate that the Japanese, who were able, owing to their superior speed, to choose

* This is the weight of the steel armour-piercing shell. The common shell for these 19·6. calibre 8·2-in. guns weighs only 174 lbs.

their distance, fought at extreme range. It was remarked that many of the steel projectiles, even when they encountered armour, did not burst. Yet another shell pierced the lower part of the funnel, did much damage below, and killed several stokers. All the boats were knocked to splinters. Several were also burnt, and for this reason the Chinese warships afterwards left their boats in port or dropped them overboard, retaining only a gig apiece. The military mast was hit in many places by projectiles both big and little; but neither the belt armour nor the projective 3-in. steel deck of the ship was injured. The torpedo officer, at one moment in the action, discharged a torpedo, but he was incapable, when questioned, of saying when, why, or at what ship. All the torpedoes, six in number, were, by oversight, above the armoured deck during the engagement, but none were hit. The range seems never to have been less than 2000 yards, so that torpedoes really had no opportunity. At length the Tsi Yuen was enabled to steer again, and she at once steamed at her best speed for Wei-hai-wei, chased by the Yoshino. Thenceforward she used almost exclusively the single 5·9-in. gun in her after-turret, and as the gear, &c., on the deck aft had never been properly cleared away, this did some little damage to the vessel, besides destroying the awning which was still spread. The gun, however, did good work. Chinese accounts aver that a shell from it swept the Yoshino's bridge, and that the next one demolished her chart-house; and it seems certain that at last, for some reason or another, the Japanese relinquished the pursuit after a four-and-a-half-hours' chase. Next morning at six o'clock the Tsi Yuen reached Wei-hai-wei, whence she proceeded to Port Arthur to be docked, and to take on board two out of twenty Gruson 1·97-in. 4-pr. quick-firing guns which had recently arrived from Europe. She lost in the action three officers and thirteen men killed and nineteen people badly wounded. She was hit hundreds of times. A photograph of part of the port-side of her superstructure shows marks of seventeen projectiles on a plate measuring only about 6 ft. by 2 ft. 6 in. The adjoining plate bears twelve marks, and the next one five. Of these thirty-four marks, nine or ten are large holes, caused apparently by 4·7-in. or 6-in. shot. "The vessel," according to a European officer who saw her at Wei-hai-wei, "presented the appearance of an old wreck. The mast was shot through half way up, the gear was torn to pieces, ropes hung loose and tattered. . . . On deck the sight was cruel, and beggars description. Woodwork, cordage, bits of iron and dead bodies, all lay in confusion. Between decks matters were as bad." And a British officer writes: "The slaughter had been awful, blood and human remains being scattered over the decks and guns. . . . Huge fragments of armour

and backing" (probably in the turret) "had been torn from their fastenings and carried inboard, crushing a number of poor wretches into shapeless masses, even the upper part of the funnel being splashed with blood." She was again ready for sea on August 7th, when she was undocked.

As for the despatch-boat, Tzan Chieng, which was said to have treasure on board,* she was followed and taken after the sinking of the Kowshing. The third vessel, the Kuang Yi, was pluckily fought, and had no fewer than thirty-seven of her people killed. Having received a heavy shot below the water-line, she was run ashore by her commander, and the survivors saved themselves. One of the Japanese vessels soon afterwards fired into her and completed her destruction.

Declaration of war.

At this time, although war had not been declared, it had for several days been seen to be inevitable. As early as July 21st, Commander McGiffen, of the Chen Yuen, writing from Wei-hai-wei, described how the turrets of the Chinese ironclads had been reinforced by coal bags piled around them to a thickness of eight or ten feet. On July 26th, after the arrival of the battered Tsi Yuen, all the sea-worthy Chinese ships at Wei-hai-wei put to sea to look for the enemy, but remained out for only three days, since it was found that the weather was very trying to the crews of the small craft, and especially of the torpedo-boats of the squadron. Soon afterwards the fleet went out again. War was formally declared on August 1st, and writing on the following day, when the Chen Yuen was off the south-west coast of Corea, Commander McGiffen said: "We are now on our way with six good ships to meet the enemy . . . and I hope we will sink the dogs. . . . Admiral Ting and I wished to go to Chemulpo and open fire on the Jap Fleet, but at the last moment we got a direct cable from the Tsung-li-Yamen not to do so. It would have been splendid, for we should have destroyed their navy almost, I think. . . . We are all clear for action, everything that could possibly cause splinters left ashore or thrown overboard. We have left all our boats behind. We will not need them, for, if we sink, the Japs will give no quarter; and we shall give none either. The Admiral is in the Ting Yuen. I am here in the Chen Yuen with Rear-Admiral" (?Commodore) "Liu Tai Tsan. My post is in the conning tower by his side, to fight the ship. Admiral Ting made two general signals to-day at noon. One: 'If the enemy shows the white flag, or hoists the Chinese ensign, give no quarter, but continue firing at her until she is sunk.'† The

* It is doubtful whether this treasure, 200,000 taels, was in the Tzan Chieng, or in a Chinese merchant steamship which, laden with ammunition, &c., was taken that morning and towed into Chemulpo.

† This barbarous order is quoted here to show that the Chinese were as bloodthirsty and unrelenting in cold blood, as the Japanese may once or twice have been in hot. Yet Admiral Ting was counted among the most enlightened of Chinese naval officers.

other : 'Each officer and man do his best for his country to-morrow I expect to congratulate you on a victory over the enemy to-morrow afternoon.' He is a fine old fellow with a good war record ; a pity he doesn't know a word of anything but Chinese."

Japan's use of sea power.

No action followed on August 3rd, and the Chinese steamed home again, and, in consequence of the representation of Li Hung Chang, were ordered thenceforward to remain on the defensive, especially for the protection of the gulf of Pe-chi-li. Thus it did remain, leaving for some weeks the unchallanged command of the sea to the Japanese, who more than once reconnoitred the Chinese harbours and endeavoured to tempt the enemy to come out. On August 10th, a Japanese Squadron appeared off Wei-hai-wei, and during three hours fired about 100 projectiles at the forts, at ranges varying from 6000 to 9000 yards, but did no damage ; neither were the forts, which replied, much more successful. A day or two later Admiral Ting, cruising off Chefoo, sighted the Japanese, and returned, without showing fight, to the protection of Wei-hai-wei. It is even alleged that on one or two occasions the Japanese pushed their reconnaissances so far as to send their torpedo-boats right into Wei-hai-wei harbour by night, in spite of obstructions and mine-fields ; and that the fact of their entrance was only revealed to the defenders in the morning, when it was seen how booms had been shifted, and cables and wires cut. Chinese inactivity enabled Japan to transport large numbers of troops to Corea almost without convoy, and the Japanese Admiralty seems to have felt that at that early stage of the campaign it was even more important to keep the Chinese Fleet in or near its own ports than to bring it to action. But early in September, when the council at Tientsin began to realise that Japan was pouring armies into Corea much more rapidly by sea than China could pour them in by land, and when already Japan had won some striking successes on shore, it was rather unwillingly decided that the fleet must be risked to convoy transports if anything really serious was to be attempted to prevent a Japanese invasion of Manchuria.

Events leading to the battle of Hai-yun-tau.

In pursuance of this resolution, the chartered steamers (chiefly if not exclusively, belonging to the China Merchants' Steam Navigation Company, of Shanghai) Hsingu, Toonam, Chintung, Leeyuen, and Haeting, carrying large quantities of rice and military stores, left Taku, picked up a convoy of cruisers, and proceeded to Talien Bay, off which they found the heavier ships of Admiral Ting's command, and took on board 4500 men. Thence they steamed towards the mouth of the Yalu River, off which they arrived on Sunday, September 16th. The transports, with the warships Ping Yuen and Kuang Ping, and the torpedo-boats Fu Lung and Choi Ti,

entered the harbour of Takushan; while the rest of the fleet anchored in twenty-five fathoms, ten miles to the southward, or in lat. 39° 63′ N. and long. 124° 9′ E.†

It should here be noted that, according to Herr von Hanneken, who was in the Ting Yuen in the double capacity of Inspector of Coast Defences and Adviser to Admiral Ting, the Chinese Admiral had originally intended to take his fleet from Talien Bay to Peng-yong-do Island, and thence to Ping-yang Inlet, searching by the way for the Japanese, who were reported to be thereabouts, and, if possible, to defeat the enemy and secure the command of the sea before attempting to convey the transports. But, as telegrams from Wei-hai-wei signalled the presence of two large Japanese vessels off that place, and as he expected a steamer loaded with war material to reach Wei-hai-wei on September 14th, he first went thither, and remained until the evening of the 14th, without, however, seeing anything of the Japanese. Having returned to Port Arthur early on the 15th, he there learnt of the fall of Ping-yang, and found that the Japanese land forces were pressing northward and that telegraphic communication was interrupted. He felt, therefore, that he had no time to lose. The project of searching for the Japanese Fleet was abandoned, the troops were embarked, and the convoy left Talien Bay at 1 o'clock A.M. on Sunday the 16th; the transports in line ahead keeping inshore, and the warships, also in line ahead, steaming abreast of them to seaward.

While Admiral Ting was thus busy in convoying transports, the Japanese were similarly engaged. A fleet escorting thirty transports from Japan reached Caroline Bay on September 14th, and in the evening departed for the Taidong river, which runs down through Ping-yang into the Ping-yang inlet, leaving the Third Flying Squadron ‡ to cover the landing of the troops. Off the Taidong on the morning of the 15th, the Japanese Commander-in-Chief heard of the commencement of the attack on Ping-yang, and sent four of

* Generally known as the battle of Yalu.—ED.

† In the Admiralty Chart of 1860, and in the special Chart issued by the Naval Intelligence Department of the United States, the position of the Yalu Mouth is misplaced. The Japanese are said to have very thoroughly re-surveyed the coast in 1890–91, and to have had charts of great accuracy.

‡ The Third Flying Squadron on this occasion consisted of:—

Type.	Name.	Tons.	I.H.P.	Guns of 4·7 in. and upwards.
Belted Cruiser .	Kongo	2250	2035	10
Composite Cruiser .	Takao	1760	2300	5
,, ,, .	Yamato	1480	1600	7
,, ,, .	Musashi	1480	1600	7
,, ,, .	Katsuragi	1480	1600	7
Wooden Cruiser .	Tenryu	1580	1165	7

		Ships.	Tons.	I.H.P.	Estimtd. Speed Knots.	Crew.	Armament.	Torpedo Tubes.	Rig.	Commanders, etc.
JAPANESE.	Main Squadron.	Matsushima	4277	5400	15·5	360	1 12·6-in., 12 4·7-in. Q.F.; 5 6-pr. Q.F.; 11 3-pr. Q.F.; 6 M.	4	1 mil. mast	Vice-Admiral Ito Captain Omoto
		Itsukushima	4277	5400	15·5	360	1 12·6-in., 11 4·7-in. Q.F.; 5 6-pr. Q.F.; 11 3-pr. Q.F.; 6 M.	4	1 mil. mast	Captain Yoko-o
		Hashidate	4277	5400	15·5	360	1 12·6-in., 11 4·7-in. Q.F.; 5 6-pr. Q.F.; 11 3-pr. Q.F.; 6 M.	4	1 mil. mast	Captain Hidaka
		Chiyoda	2450	5600	17·0	..	10 4·7-in. Q.F.; 14 3-pr. Q.F.; 3 M.	3	3 mil. masts	Captain Uchida
		Fusoo	3717	3500	11·5	386	4 9·4-in.; 2 6·6-in.; 4 small; 5 M.	..	Barque	Captain Arai
		Hi-yei	2200	2030	10·8	308	3 17-cm.; 6 15-cm.; 4 M.	..	Barque	Captain Sakurai
	Flying or Van Squadron.	Yoshino	4150	15000	19·5	..	4 6-in. Q.F.; 8 4·7-in. Q.F.; 22 3-pr. Q.F.	5	2 mil. masts	Rear-Admiral Tsuboi Captain Kawara
		Takachiho	3650	7500	17·3	365	2 10·2-in.; 6 5·9-in.; 2 3-pr. Q.F.; 10 M.	4	2 mil. masts	Captain Nomura
		Naniwa	3650	7500	17·5	365	2 10·2-in.; 6 5·9-in.; 2 3-pr. Q.F.; 10 M.	4	2 mil. masts	Captain Tōgō
		Akitsusu	3150	8400	17·8	..	4 6-in. Q.F.; 6 4·7-in. Q.F.; 10 3-pr. Q.F.	4	2 mil. masts	Captain Kamimura
	Not in the Line.	Akagi	615	700	11·2	113	4 5·9-in.; 1 4·7-in.(?) 2 M.	..	Brig	Commander Sakamoto*
		Saikio			11·0	..	Armed cruiser	..	2 masts	(Vice-Admiral Viscount Kabayama) Commander Kano
CHINESE.	Ships in Line of Battle.	Ting Yuen	7330	6000	12·0	250	4 12-in.; 2 5·9-in.; 2 4-pr. Q.F.; 8 M.	3	2 mil. masts	Admiral Ting Commodore Liu Poo Chin
		Chen Yuen	7330	6000	11·5	250	4 12-in.; 2 5·9-in.; 2 4-pr. Q.F.; 8 M.	3	2 mil. masts	Commodore Lin
		*King Yuen	2850	3600	13·5	270	2 8·2-in.; 2 5·9-in.; 2 4-pr. Q.F.; 3 3-pr. Q.F.; 8 M.	4	1 mil. mast	
		Lai Yuen	2850	3600	14·0	270	2 8·2-in.; 2 5·9-in.; 2 4-pr. Q.F.; 3 3-pr. Q.F.; 8 M.	4	1 mil. mast	
		Tsi Yuen	2355	2800	13·0	180	2 8·2-in.; 1 5·9-in.; 2 4-pr. Q.F.; 9 M.	4	1 mil. mast	Captain Fong
		*Chih Yuen	2300	7600	15·0	250	3 8·2-in.; 2 5·9-in.; 7 6-pr. Q.F.; 2 4-pr. Q.F.; 2 3-pr. Q.F.; 8 1-pr. Q.F.; 6 M.	4	2 mil. masts	Captain Tang
		Ching Yuen	2300	7600	15·0	250	3 8·2-in.; 2 5·9-in.; 7 6-pr. Q.F.; 2 4-pr. Q.F.; 2 3-pr. Q.F.; 8 1-pr. Q.F.; 6 M.	4	2 mil. masts	
		*Chao Yung	1350	2400	13·5	130	2 9·8-in.; 4 5·1-in.; 2 4-pr. Q.F.; 7 M.	3	Schooner	
		*Yang Wei	1350	2400	13·5	130	2 9·8-in.; 4 5·1-in.; 2 4-pr. Q.F.; 7 M.	3	Schooner	
		*Kuang Chia	1296	2400	13·8	..	1 4·7-in.; 1 4·7-in. Q.F.; 2 4-pr. Q.F.; 8 M.	4	..	
	In-shore Flotilla.	Ping Yuen	2100	2400	9·0	..	1 10·2-in.; 2 5·9-in.; 8 3-pr. & 1-pr. Q.F.	4	..	
		Kuang Ping	1000	1200	9·5	..	1 4·7-in.; 1 4·7-in. Q.F.; 8 M.	4	..	
		Fu Lung	128	1600	15·0	..	(Schichau torpedo-boat) 4 M.	3	..	
		Choi Ti	69	1000	15·0	..	(Yarrow tor.-boat) 3 1-pr. Q.F.; 4 M.	3	..	

* Lost in, or in consequence of, the action.

NOTE.—The quick-firing armament of some of the Chinese ships may not have been exactly as stated; seeing that various changes had been made not long before. Authorities differ as to the armament of the Kwang Chia. The Japanese *Official Gazette* gave it, on one occasion, as three 5·9-in., four 4-in., one 3·9-in., four 3-pr. Q.F., and two machine guns.

The speeds given above are estimated as the best speeds of which the vessels were at the time capable, and are supplied by a British officer on the station.

The Matsushima, Itsukushima, and Hashidate have 1·57-in. steel decks, armoured hatch-combings, cellulose belts, and single barbettes, placed aft in the first, and forward in the other two. The barbettes have 11·8-in. armour, and 4-in. revolving cupolas.

The Chiyoda has a 4·6-in. chrome steel belt for two-thirds of her length, a cellulose belt behind it, good coal protection, a 1-in. steel deck, cellular double bottom, and eighty-four watertight compartments.

The Fusoo has a 9-in. belt and 8-in. battery armour, and is an iron central-battery ship of the old type.

The Hi-yei, a composite vessel, has a 4·5-in. belt.

The Yoshino has a complete steel deck 1·75-in. thick on the top, and from 3·5 to 4·5-in. thick on the slopes.

The Naniwa and Takachiho, vessels of the Esmeralda type, have steel decks from 2-in. to 3-in. thick, armoured hatch-combings, armoured gratings, and conning towers.

The Akitsusu has deck protection.

The Ting Yuen and Chen Yuen have 14-in. belts for about three-fifths of their length, 12-in. armour on the two main turrets, 8-in. conning towers, and 3-in. steel decks.

The King Yuen and Lai Yuen have partial belts of 9·4-in. armour over the vitals, and 5·1-in. armour for the rest of about three-fifths of their length, with 7·8-in. covered barbettes, 5·9-in. conning towers, and 3-in. steel decks.

The Tsi Yuen has a 3-in. steel deck and a 9·8-in. turret of compound armour.

The Chih Yuen and Ching Yuen have steel decks from 1·9 to 3·9-in. thick, with steel shields over the two forward guns.

The Chao Yung and Yang Wei have 3-in. steel decks, below the waterline, over the vitals only.

The Ping Yuen has an 8-in. belt, and 5-in. armour on the barbette and conning tower, with a 2-in. deck.

The Kwang Ping, and probably also the Kwang Chia, has a 1-in. deck over the vitals.

his vessels* up the river to co-operate with the army. Retaining with his flag his Main, and his First Flying Squadron, he anchored off Cape Shoppek, and, on the afternoon of the 16th, accompanied by the despatch-vessel Akagi, and the armed cruiser Saikio, he weighed and proceeded to reconnoitre the island of Hai-yun and the estuary of the Tayang river. Vice-Admiral Viscount Kabayama, chief of the Naval General Staff, who was on a tour of inspection, was in the Saikio, and was for the moment accompanying the fleet in hopes of seeing some fighting, rather than in the strict prosecution of his duty.

The battle of Hai-yun-tau.

I give below the substance, kindly translated and furnished to me by Captain Yendo, of Vice-Admiral Ito's official report of what followed. The document is dated September 21st, 27th year of Meiji :—

Admiral Ito's despatch.

"On September 16th the Fleet under my command left the rendezvous, the van squadron consisting of the Yoshino, Naniwa, Takachiho, and Akitsusu, and the main squadron of the Matsushima, Hashidate, Itsukushima, Fusoo, Chiyoda, and Hi-yei; accompanied by the Saikio and Akagi, proceeded to Hai-yun-tau. On the 17th, at 6.30 A.M., having arrived off the anchorage of that island, I examined the interior of the harbour, and, discovering no signs of the enemy, proceeded for Talu Island, off Takushan.

"At 11.30 A.M. I observed smoke bearing E.N.E. on the starboard bow. It appeared to rise from several steamers.

"At 0.5 P.M. I hoisted a large ensign on my mainmast, and having ordered my ships to clear for action, signalled to the Saikio and the Akagi, in order to ensure their safety, to shift their positions to the port side of the main squadron. At this time two of the enemy's ships were observed on the port bow.

"The van squadron, first heading for the centre of the enemy's line, then gradually † kept away to port, and advanced towards the enemy's right wing. The main squadron followed the movement of the van.

"The formation of the enemy's fleet appeared to be single line abreast, but may have been arranged either in échelon or irregularly. In the centre were the sister battleships Ting Yuen and Chen Yuen,

* These were the following :—

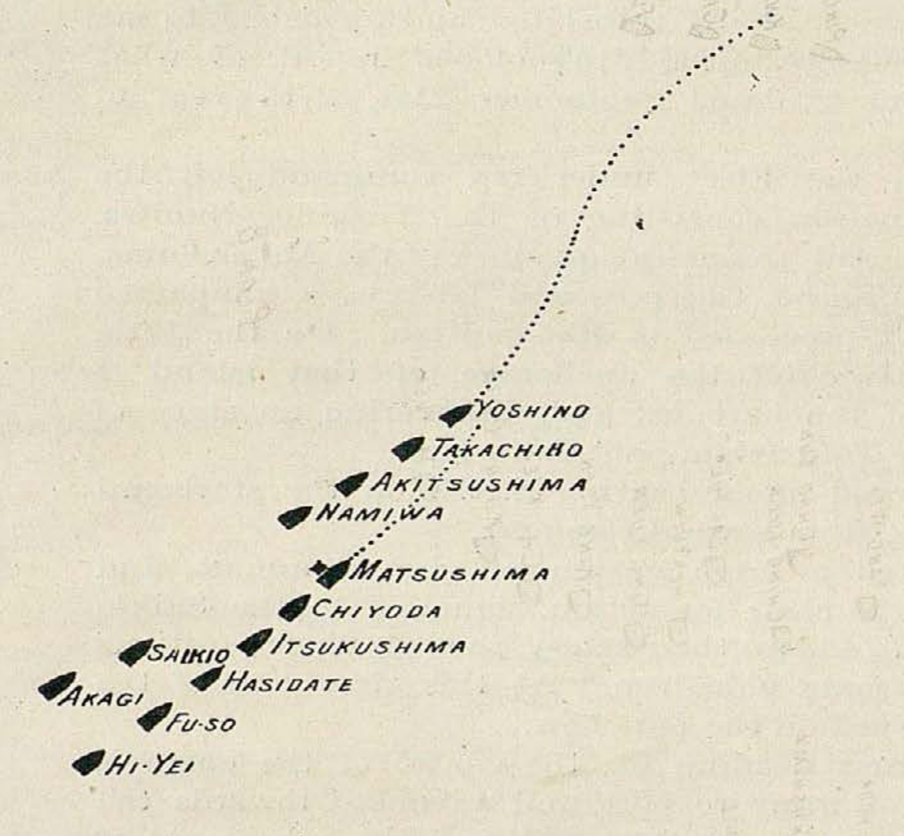
Type.	Name.	Tons.	I.H.P.	Guns of 4·7 in. and upwards.
Composite Gunboat .	Chokai	615	950	2
" " .	Maya	615	950	4
Steel Cruiser . . .	Tsukushi	1350	2400	6
Wooden Gunvessel. .	Banjo	595	590	2

These were accompanied by torpedo-boats.

† See Plan A.

with the Lai Yuen, King Yuen, Ching Yuen, and Chih Yuen next them on either side, and with the inferior ships on the flanks, the whole number of the enemy's ships being ten.

"At 0.50 P.M., the enemy opened fire upon my van squadron at a range of 5000 or 6000 yards. The van continued on its course without returning the fire until within about 3000 yards, when it poured in a vigorous reply, and turning to starboard passed round the enemy's right wing. At that time the enemy's principal ships—the wing ships on both sides meanwhile already beginning to head in



PLAN A.
The Approach.

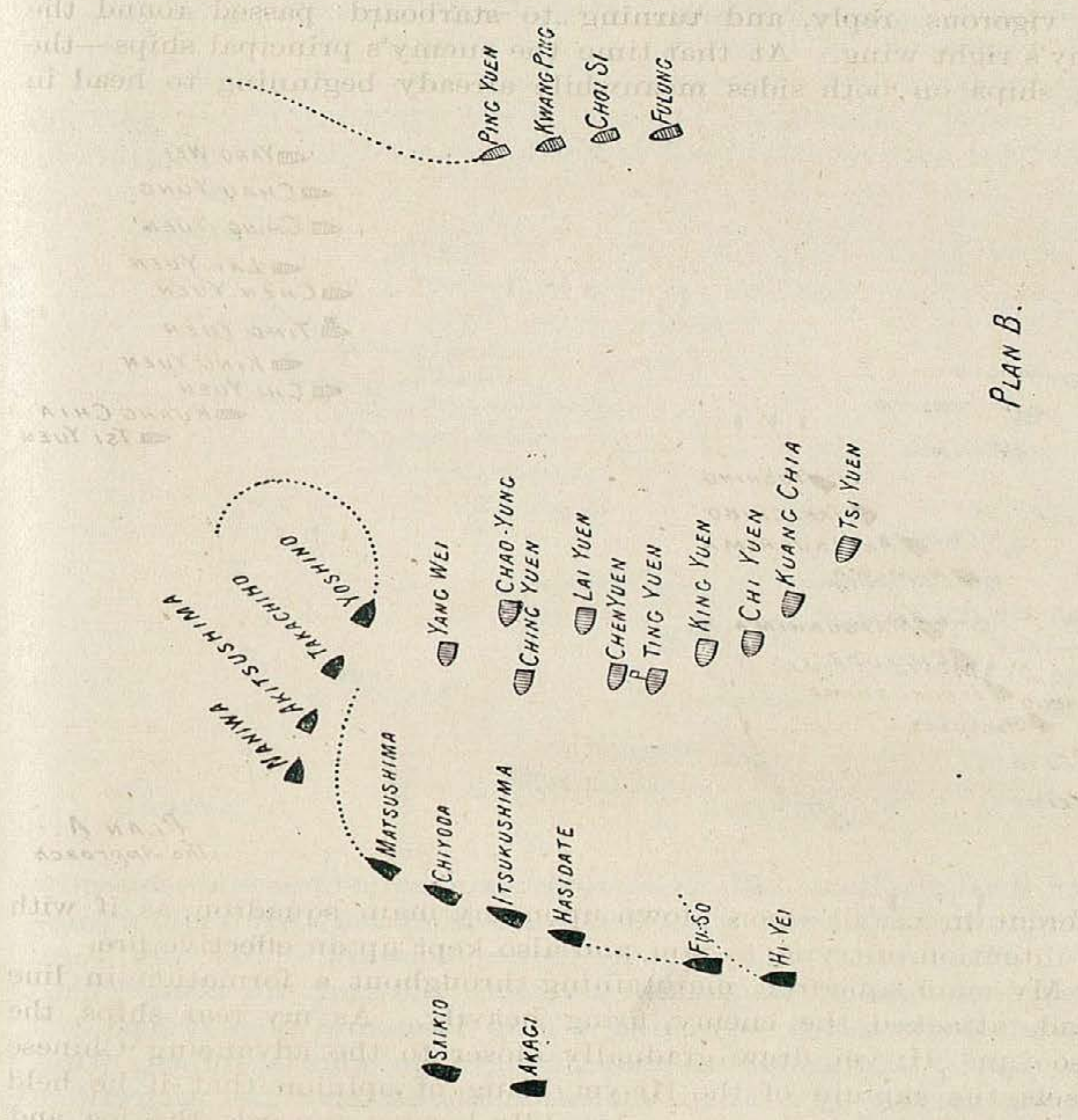
different directions—bore down upon my main squadron, as if with the intention of trying to ram, and also kept up an effective fire.

"My main squadron, maintaining throughout a formation in line ahead, attacked the enemy, firing heavily. As my rear ships, the Fusoo and Hi-yei, drew gradually closer to the advancing Chinese vessels, the captain of the Hi-yei, being of opinion that if he held his course he might be rammed, boldly headed towards the foe, and passed* through his line between the Chen Yuen and the King Yuen.†

* See Plan C.

† Chinese information seems to indicate, beyond all reasonable doubt, that this vessel was the Ting Yuen, and that Admiral Ito was mistaken, or that the names were confused during the transcription and printing of his despatch.

Exchanging fire with other ships as well, he rejoined the main squadron, which by that time had circled round the right wing and was attacking the enemy from the rear. The Chinese Fleet was already so confused that its formation could no longer be said to exist. It was then that I observed fresh hostile ships, with torpedo-boats, coming out from the direction of Talu Island, as if to join the main body.



"After passing round the enemy's right wing, my van squadron, observing the Hi-yei and Akagi as likely to be in great danger,* had reversed its course, and, heading for a point between the Akagi and the foe, proceeded at its highest speed to the aid of the imperilled vessels,

* See Plan B.

and attacked the enemy on the latter's port side, so that at that moment while my van was firing into the enemy from one direction, my main squadron was doing the same from the opposite one. The Yang Wei caught fire, and running across my course ahead of me, went away in the direction of Talu Island, eventually grounding. The Ting Yuen, Chao Yung, and Kuang Chia, having also burst into flames, began to retire from the action, and presently fire was observed to have broken

out in the Lai Yuen. My van and main squadrons subsequently attacked* the Ting Yuen and Chen Yuen from both sides simultaneously. The former was soon in flames forward. My van then proceeded in chase of the runaway vessels, and sank the King Yuen, the main squadron still engaging the Ting Yuen and Chen Yuen.

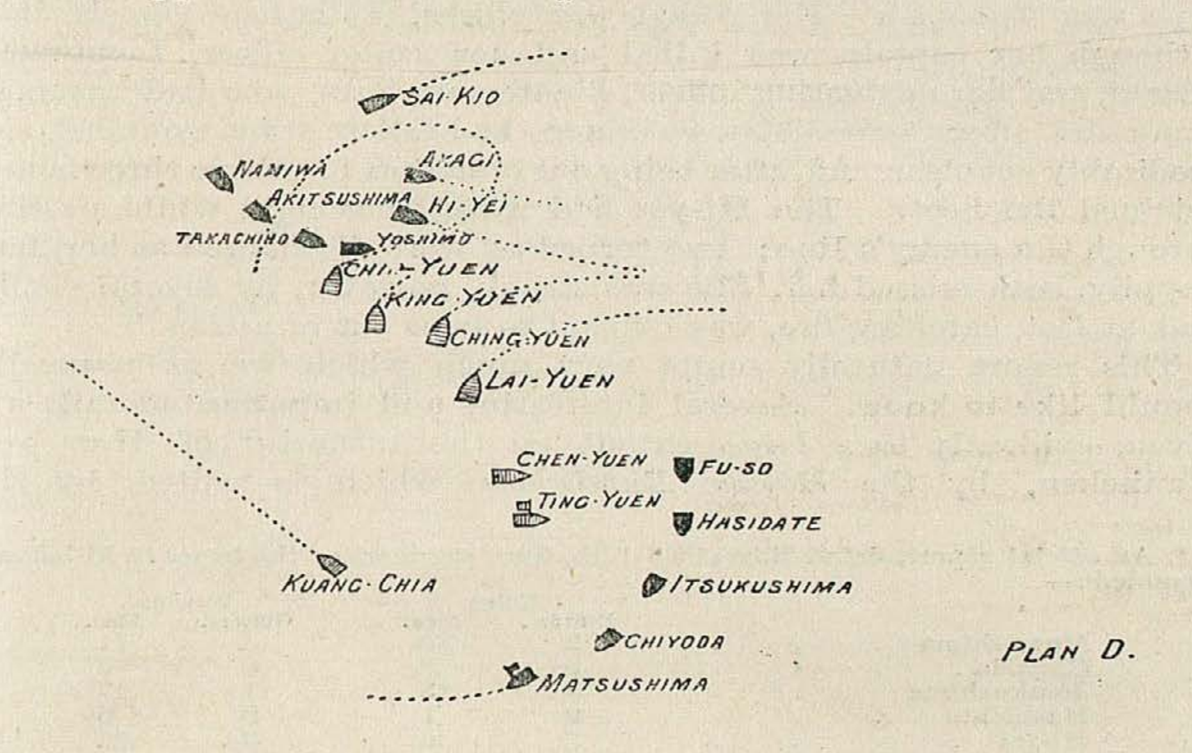
"At 3.26 P.M., the Matsushima, being then abreast of the Ting Yuen, was struck by a 12-in. shell from the latter. The projectile †

* See Plan E.

† The flagship seems to have previously received a 10·5-in. shell, fired from the Ping Yuen, if Mr. Inouye's account is to be trusted. The 12-in. shell struck and threw a 4·7-in. or, according to some accounts, a 6-pr. gun, overboard and killed or wounded upwards of forty people. The Matsushima's 12·6-in. gun was by this time disabled, and but for the splendid behaviour of the ship's marines the magazine would have caught fire and blown up.

burst in the fore battery, occasioning great damage, and causing fire to break out.

"At 3.30 P.M., the Chih Yuen was observed to be sinking. At about 5.30 P.M., seeing that the Ting Yuen and Chen Yuen had been joined by other ships, and that my van squadron was separated by a great distance from my main force, and considering that sunset was approaching, I discontinued the action, and recalled my van squadron by signal. As the enemy's vessels proceeded on a southerly course, I assumed that they were making for Wei-hai-wei, and having reassembled the fleet, except the Hi-yei and the Saikio, I steamed upon what I supposed to be a course parallel with that of the foe, with the



PLAN D.

intention of renewing the engagement in the morning, for I deemed that a night action might be disadvantageous to us, owing to the possibility of the ships becoming separated in the darkness, and to the fact that the enemy had torpedo-boats in company. I lost sight, however, of the Chinese, and, at daylight, seeing no signs of the foe, I returned to the scene of the action, ordering the Akagi in the meanwhile to proceed to the port of rendezvous. Discovering the Yang Wei on a reef, I directed the Chiyoda to send a boat with a spar-torpedo and to destroy her bottom; and on the morning of the 19th, the fleet made the rendezvous. As the result of this action the enemy lost the King Yuen, Chih Yuen, Yang Wei, and Chao Yung; and the Lai Yuen, Ping Yuen, and Ting Yuen had serious fires on board,

and, no doubt, in common with other vessels, received grave damage. On our side we lost no ships. The casualties* and damages are set forth in the reports of individual captains. The Matsushima was the heaviest sufferer.

"During the action the Saikio, as well as the Hi-yei and Akagi, were in considerable peril, separated as they were from my main squadron, and attacked by several vessels. At one time the Saikio was engaged simultaneously by two ships and two torpedo-boats.† A torpedo was discharged at her at the close range of about fifty yards, and she narrowly escaped destruction, for the weapon passed under her. She received several projectiles in her hull and funnel, and her steam-pipe was damaged. The Akagi was chased by hostile vessels, but, although her captain was killed and her senior officer, Lieutenant Sasaki, and her navigating officer, Lieutenant Sato, who had assumed command after Commander Sakamoto had fallen, were wounded, she creditably got clear, and, after being out of action for about three hours, rejoined the fleet. The Hi-yei had a very hot fight while passing through the enemy's line; two torpedoes were discharged at her, but, happily, both missed her. She was struck, however, by several shells, and at last, catching fire, was obliged to haul out of action."

The German Report, and Chinese Accounts.

This report naturally omits very much which we as naturally should like to know. Several interesting and important details are given, evidently to a large extent on the authority of Herr von Hanneken, by the *Marine Rundschau*, which is edited by the

* An official report, dated November 17th, thus summarises the losses in killed and wounded :—

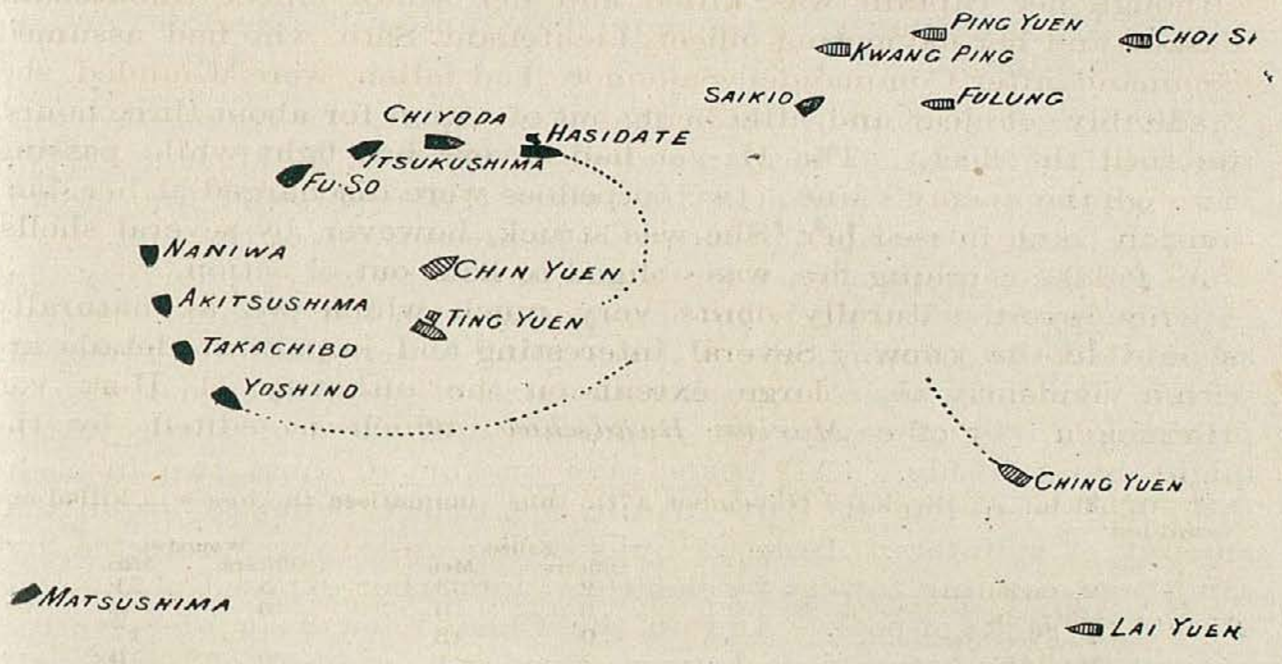
	Killed.		Wounded.	
	Officers.	Men.	Officers.	Men.
Matsushima . . .	2	33	5	71
Chiyoda	0	0	0	0
Itsukushima . . .	0	13	1	17
Hashidate . . .	2	1	0	9
Hi-yei	3	16	3	34
Fusoo	0	2	2	10
Yoshino	0	1	2	9
Takachiho . . .	0	1	0	2
Akitsusu . . .	1	4	0	10
Naniwa	0	0	0	1
Akagi	2	9	2	15
Saikio	0	0	1	10
Total	10	80	16	188

Total killed and wounded, 294. Of the wounded who died subsequently, either on board ship or in hospital, were :—of the Matsushima, one officer and twenty-one men ; of the Itsukushima, one man ; of the Hi-yei, four men ; of the Fusoo, one officer and two men ; of the Yoshino, one officer ; and of the Saikio, one man. At the date of the report only two officers and sixty-one men remained in hospital.

Commander Sakamoto, of the Akagi, was killed by the shooting away of his vessel's mizzen mast, from the rigging of which he was giving his orders. Another account says that being on the bridge he was killed either by the shell which brought down the mast, or by the falling mast itself.

† See Plan E.

Intelligence Department of the German Admiralty. It appears that in addition to their 1·85-in. 3-pr. and 1·46-in. 1-pr. Hotckiss guns, the Chinese Fleet had, shortly before the declaration of war, received and mounted twenty Gruson 1·97-in. quick-firing guns, two of which, as has been already noted, were assigned to the Tsi Yuen after the action off Asan. How the others were distributed is not absolutely certain; but in the table on p. 102 I have accounted for them in accordance with information which appears to be trustworthy. The provision of ammunition was unsatisfactory. In August the naval authorities, having in view the large number of unarmoured ships in the Japanese Fleet, asked for a further supply of shells. Li-Hung-Chang backed up the request, but the Director of Artillery seems to have



PLAN E.

opposed the demand on the ground that it reflected upon him. The heavy guns, therefore, had but fifteen rounds of common shell apiece, and fired them all away in an hour and a half; after which they had only armour-piercing shell. The Chinese guns, with the exceptions above indicated, were by Krupp or Armstrong; the Japanese ones were by Canet, Krupp, and Armstrong, and some of their projectiles by Gruson. Some of their quick-firing guns had smokeless powder. The report goes on to say that the Chinese Commander-in-Chief had acquired the conviction that the variety of types represented in the ships composing his Fleet would prevent them from properly coöperating in action, more especially since the signal book at his disposal was insufficient for the necessities of so large a force, since

Admiral Ting's fighting instructions.

the captains had little experience, since the signalling department was very short-handed, and since, in short, it was by no means certain that any signals would be comprehended. He therefore determined that, only while cruising, would he attempt to control the fleet, and that in action the ships must act independently, each captain utilising his vessel as might seem most advantageous. In consequence the captains were given the following fatal general instructions:

1. In action, sister ships, or sub-divisions of pairs of ships, shall as far as possible remain together, and support one another in attack and defence.
2. A ruling principle should be to keep bows on to the enemy.
3. All ships must, as a general rule, follow the motions of the Admiral.

The first formation in which the enemy was to be approached was the fighting formation recommended by Captain W. M. Lang, R.N., viz.: columns of divisions in line abreast, the ships of the second division being in rear of the intervals between those of the first.

As for their preparations for battle, the ships had profited by the experience of the Tsi Yuen in her combat with the Yoshino. So far as possible, the covering tops of the conning towers had been removed with a view not only to reducing the size of the target, but also to providing a way of escape for fragments and gases of shells which might burst inside. All boats save one or at most two in each ship, had been left at Port Arthur, the object being to lessen the amount of splinters. Isolated quick-firing guns were protected by sand-bags, conning towers by mantlets, and other exposed places and objects by sacks of coal. And in the Chen Yuen, as a preservative against fire, the between decks were flooded to a depth of about half an inch. The European officers in the fleet were: in the Ting Yuen, Herr von Hanneken, adviser to Admiral Ting, Mr. Tyler, commander, Mr. Nichols,* gunnery lieutenant, and Herr Albrecht, chief engineer. In the Chen Yuen, Mr. McGiffen, commander, and Herr Heckmann, gunnery lieutenant; in the Chih Yuen, Mr. Alexander Purvis,† engineer; and in the Tsi Yuen, Herr Hoffmann, engineer.

According to the accounts of the European officers who survived, the appearance of suspicious smoke ‡ to the southward, was reported to Admiral Ting soon after 10 A.M. He at once weighed and steered

* Killed. He had, it is understood, been a petty officer in the Royal Navy.
† Went down with the ship.
‡ The Japanese burnt coal, which on certain occasions betrayed them at a distance of forty miles.

southward in the pre-arranged formation, at a speed of between five and six knots. For some reason the wing ships at both ends of the line dropped behind from the beginning, and thus it was that the fleet appeared to the Japanese to be in a kind of V-shaped formation. During the approach the men had no dinner. In the Japanese fleet, on the contrary, the men were piped to dinner directly after the smoke of the Chinese ships had been reported to Admiral Ito. He is said to have signalled : "Dinner, for we cannot fight well on empty stomachs." The time when the Ting Yuen opened fire is given at 0.20 P.M., and the distance at about 6000 yards. The shot fell short. The concussion threw from the bridge all who were there, and Admiral Ting was so much hurt by the fall, that he had to be carried below, and for the time to surrender the command to Commodore Liu Poo Chin, captain of the ship. A little before the Japanese van had begun to circle round the Chinese right, the Chinese ships turned together about two points to starboard, thereby increasing their disorder. When the head of the Japanese van division was about to turn to starboard, the entire Japanese line opened at about 3300 yards, and did great damage to the Chinese right wing. One of the earliest shells destroyed all the signalling gear of the Ting Yuen, and swept away the signal men, who had no protection. From that moment the fleet had no leader. The mere example of the flagship, excellent though it was, had no influence whatsoever on the other ships. Meanwhile both Chinese wings* had dropped further astern. The Chao Yung, in flames, endeavouring to run for Talu Island, where she hoped to beach herself, was rammed by the Tsi Yuen, which was seeking to escape, and sank in shallow water. Her people took refuge in her rigging, and later were rescued by the torpedo-boats. Why the Tsi Yuen took to headlong flight and never troubled herself to assist her sinking consort is unknown. Her captain afterwards paid for his conduct with his head. The ship had not suffered appreciably from the Japanese fire. The recoil of her stern gun had damaged its training gear, and a few men had been killed by the explosion of a shell, but the ship was otherwise sound. The Kuang Chia† also quitted her station on the left wing, and made off in the direction of Wei-hai-wei, but managed in the course of the following night to run ashore in Talien, near Port Arthur. She was found to be without a leak or any serious damage, and vain efforts were made to tow her off. On September 23rd she was discovered there by the Naniwa

* See Plan B.

† She belonged to the Fuhkien or Canton Squadron. All the other Chinese ships engaged, except the Kuang Ping, of the same squadron, belonged to the Northern Squadron.

and Akitsusu, and, her crew abandoning her, she was destroyed by these vessels. According to another account she had first been partially blown up by her own people.

The Chinese Fleet, thus reduced to six ships, circled as well as it could inside the Japanese squadrons; but the vessels were in no sort of order, and masked one another's fire. At about the time when the vessels that were coming out of Takushan were sighted by the Japanese van division as it overlapped the Chinese right wing, Rear-Admiral Tsuboi,* turned away to port, without waiting for orders from his commander-in-chief, in order to succour the Akagi and Hiyei; but the Chinese inshore flotilla did not desire to get into close action, and made no attempt to follow up the Japanese van. At that time the King Yuen, and Chih Yuen, and presently also the Lai Yuen and Ching Yuen were steaming† after the two damaged Japanese vessels, when the returning Japanese van intervened. The movement did not, however, prevent the Lai Yuen and Ching Yuen from following for some little time longer, for the van continued its turning and passed on to complete a second circle. The Lai Yuen was at one moment but a cable and a half astern of the Akagi,‡ and might have caught her, had not a fortunate shell from the little craft set the Chinese ship on fire. The flames quickly assumed such proportions § that the men were driven from the engine-room by the smoke, and only one gun could thenceforward be worked. In the meanwhile the Chih Yuen had turned upon the Yoshino with the intention of ramming her, but was so badly hit about the water-line by several shells that she sank, turning over to starboard. The effect upon her of the simultaneously bursting projectiles is said to have resembled that of a torpedo.‖ The King Yuen, already set on fire by the Japanese van, went down a little later, stern foremost, perishing, like her consort, by shell fire.

When the Japanese van had made its second circle to port, it proceeded to the Chinese main body, by that time reduced to the two ironclads, Ting Yuen and Chen Yuen, and circled round it,° still to port, while the Japanese principal squadron did the same to starboard. This circling was continued, the Japanese pouring in a concentrated fire and keeping at a range of between 2200 and 3300 yards. Both ironclads are declared by the Chinese to have several times tried to get into closer action, but the efforts, if made, must have been made

* See Plan B. † See Plan C. ‡ See Plan D.

§ The Lai Yuen was on fire for eight hours, and was entirely gutted, her frames being bent and her plates warped. She managed, however, to reach Port Arthur.

‖ See remarks later as to the possibility that one of her torpedoes in its tube may have been exploded by the Yoshino's fire.

° See Plan E.

very half-heartedly, for the Fusoo maintained her station throughout in the Japanese line, and her speed was not greater than that of the slower of the two consorts. On several occasions the Chen Yuen obviously did all that lay in her power to shield the flagship, and throughout supported her most gallantly. These had long since got rid of all their common shell, and were disheartened at seeing very little effect produced by their armour-piercing projectiles; yet they gallantly fought on. Though the Ting Yuen was on fire forward, and though the superstructures of both ships were completely riddled, neither vessel dreamt of flight. At about 3.30 P.M. there was a pause, the Matsushima having suffered so heavily that Admiral Ito transferred his flag to the Hashidate. The Matsushima then proceeded to Kure. But soon the circling began again,* and continued until the Japanese ammunition showed signs of giving out. The Chinese report of the end of the day's work flatly contradicts Admiral Ito's, for it declares that the Japanese drew off to the southward, and was pursued for an hour by the ironclads; but I am bound to say that long experience teaches me that where Chinese and Japanese accounts thus conflict, it is generally safe to accept the latter without hesitation.

The Saikio, in spite of orders to take no part in the fight, fought from 1.9 P.M. onwards, and, at the same time, got very good views† of it, if one may judge by the completeness of her captain's report. A 12-in. shell destroyed her steam steering gear, but she managed to steer with her screws, at first, however, so badly that she got within a cable's length of the two Chinese ironclads. They credited her with a design to ram, and made way for her. When at length relieving tackles were fitted she was only able to steam at very slow speed, and, in consequence, headed for Talu Island, where she found the Yang Wei ashore. The latter did not fire at her, and this was fortunate, for she was already leaking; but presently she encountered‡ the Ping Yuen, Kuang Ping, Fu Lung, and Choi Ti, which had kept away from the Japanese van, and began with them a lively engagement. The Fu Lung discharged three torpedoes at her in succession. The first failed to run, the second was avoided, and the third, of which Admiral Ito's despatch speaks, passed under her. The boat is said to have not received a single projectile, although scores were fired at her, and the distance was ridiculously small. The Saikio at last got away to Ping Yang Inlet. During the whole time Vice-Admiral Viscount Kabayama remained on her bridge.

* See Plan E.
† A number of interesting photographs of the action were taken from the Saikio.
‡ See Plan E.

After the action had ceased Admiral Ting assembled his remaining ships, and sent a torpedo-boat into Takushan to order the transports to follow him to Port Arthur. Thither he himself proceeded, and found the Tsi Yuen already at anchor there. The Chinese losses, in addition to those caused on board the ships that were destroyed, are given at only 36 killed and 88 wounded;* but about 600 or 700 are supposed to have also perished by drowning.

Torpedo, ram, and gun.

The Japanese used no automobile torpedoes during the action, and only one spar-torpedo afterwards for the destruction of the Yang Wei. Neither did they attempt to use the ram. They relied exclusively upon gun fire. On the Chinese side, also, gun fire played the chief part. The ranges were at first estimated by angles taken from the tops. Several fighting masts were later shot away. The King Yuen and the Chih Yuen made resultless attempts to use the ram. The Tsi Yuen, unintentionally, used it with fatal effect. The innocuous employment of torpedoes by the Chinese has been noted. The Choi Ti, twice delayed by accidents to her machinery, did not use them. All the ships went into action with torpedoes in the tubes, and second torpedoes, without pistols, ready in the loading trolleys. But when presently shots begun to enter the above-water torpedo-rooms, the people took off the heads of the spare torpedoes and stowed them below; also, in some vessels, flinging the pistols overboard. In the Chen Yuen, a little later, several torpedoes were discharged to sink immediately, as their presence was supposed to constitute a danger to the ship. Immediately afterwards the stern tube was actually struck by a Japanese shell. In the Ching Yuen, for the same reason, the torpedoes were hurriedly discharged, but not so as to sink, and two of them were picked up after the action. Whether the same thing happened in the Chih Yuen and King Yuen is not known; and, consequently, it cannot be determined whether or not the sudden catastrophe to the Chih Yuen was, as has been suggested, brought about by the explosion of a torpedo in one of her broadside tubes, but it is very probable that it was so. It should be added that all the Japanese ships engaged were painted white; all the Chinese ones black.

The Japanese damages.

The chief damages, other than those incidentally above mentioned, received by the Japanese ships were as follows:—The Matsushima,

*	Killed.	Wounded.
Ping Yuen	14	25
Chen Yuen	7	15
Lai Yuen	10	20
Ching Yuen	2	14
Tsi Yuen	3	0
Ping Yuen	0	12
Kuang Ping	0	2

in addition to the 12-in. shell which caused so much damage, received another of the same calibre, which passed through the vessel without bursting. The Hi-yei also received a 12-in. shell, which burst on her lower deck, destroying the mizen-mast and causing a conflagration. Another shell of large calibre burst on the upper deck, killing several men at the guns there. The Naniwa received a shell at the water-line, and it seems to have exploded in a coal bunker, without, however, doing much harm. The Chiyoda was penetrated above the water-line by a heavy shell. The Itsukushima had a shell in her torpedo-room, another half-way up her mast, and a third in her engine-room. In the Hashidate a 5·9-in. shell burst against the barbette. The Saikio received eleven shells of 4·7-in. calibre and upwards, including several heavy ones. All the vessels were, of course, hit in many places by small projectiles.

The Chinese damages.

As for the damages to the Chinese ships, the Japanese Naval Chamberlain, Commander Saito, reported that the Chiyoda had observed on the Yang Wei fifteen marks of shell of 4·7-in. calibre and upwards. A ventilator brought back from her by the Chiyoda was honeycombed with holes made by shot and fragments. The Ting Yuen's after top-mast, bearing the Admiral's flag, is said to have been shot away, and in mid-action the vessel was only able to work her stern 5·9-in. gun. Herr Hoffmann, engineer of the Tsi Yuen, stated in the *China Gazette* that his ship had one of her 8·2-in. Krupps disabled, and two other guns rendered temporarily useless, and that the collision with the Chao Yung caused the Tsi Yuen to leak badly. The Chen Yuen fired 148 6-in. shell, and exhausted all her small calibre ammunition, reaching Port Arthur with only twenty rounds of heavy shell left. The hydraulic gear of one of the guns, and the superstructure, were knocked to pieces, but the ship was otherwise little hurt. The Lai Yuen, on the contrary, was so much damaged by fire that her return to port was considered marvellous: yet even she was intact in engines, and, save so far as the effects of the flames were concerned, in her hull as well. The Ting Yuen had one of her fighting-tops struck by a ricochetting heavy shell, and destroyed, together with all the men in it. She had also a steam pipe bent, though not broken, by a projectile. In this vessel, the crack ship of the Chinese Fleet, the decomposed body of a man who had been killed in the fight was discovered nearly a fortnight afterwards, and for more than a week she was left in much the condition in which she had come out of action. A fire, which was occasioned by a shell near her sick bay forward, utterly demoralised the crew, and would have destroyed the flagship but for the personal gallantry of Herr Albrecht.

It has been shown that out of fourteen ships and vessels engaged, the

Chinese, in, or in consequence of the action, lost five, namely, the King Yuen, Chih Yuen, Chao Yung, Yang Wei, and Kuang Chia, and that of their twelve vessels the Japanese lost none. The Chinese loss was thus 35·07 per cent. of their whole force in company, or 50 per cent. of their ten ships actually in line. Of course the following comparison does not accurately indicate the nature of Vice-Admiral Ito's success, yet it is interesting and suggestive to show, side by side, the percentages of loss suffered by the defeated fleets in some of the most important naval battles of history. The figures apply to ships in line only, and, in the case of Trafalgar, no notice is taken of prizes re-captured by the enemy immediately after the action.

Victor.	Date.	Percentage of enemy's ships lost.	Victor.	Date.	Percentage of enemy's ships lost.
Rodney . .	1782	14·70	Ito . . .	1894	50·00
Jervis. . .	1797	14·81	Rodney . .	1780	53·84
Calder. . .	1805	20·00	Byng . . .	1718	54·54
Tegetthoff . .	1866	20·00	Duncan . .	1797	60·00
Howe . . .	1794	26·92	Hawke . .	1747	75·00
Hawke . .	1759	28·57	Nelson . .	1798	84·61
Nelson . .	1805	48·48	Duckworth . .	1800	100·00

That no Chinese vessel surrendered is to be attributed to the belief, studiously encouraged by the mandarins, that the Japanese would give no quarter.

The Mikado's congratulatory message to his victorious Admiral ran :—"We hear that our combined squadrons have fought gallantly in the Yellow Sea and have gained a great victory, and it is apparent that they will henceforth hold the command of the enemy's seas. Deeply appreciating the services of our officers and men, we feel devoutly thankful for the wonderful results which they have obtained."

It may here be added that a British officer on the spot reports that a Japanese naval officer with whom he has conversed estimates that fifteen per cent. of the Japanese, and ten per cent. of the Chinese projectiles fired were effective. Some of the Chinese guns were disabled by being fired when they were run in. The fighting tops proved to be of comparatively little use. The corruption in the Chinese service is shown by the fact that in peace time half crews only had been kept on board the ships, although pay was regularly drawn for full complements. As a curious instance of quasi-superstition, it is worth mentioning that the Chinese marked their cases of quick-firing ammunition with the Broad Arrow, apparently believing that the British symbol would favourably influence the effect of the projectiles.

After the action, the Naniwa and Akitsusu were sent westward to reconnoitre Port Arthur, Chefoo, and Wei-hai-wei. Off Talien Bay they sighted two Chinese men-of-war, one of which promptly went into harbour, the other, the Kuang Chia, was ashore, and, as has already been related, was destroyed. Such of the Japanese ships as needed it were repaired, and all of those engaged in the battle, except the Hi-yei and Saikio, were present at the operations in Talien Bay on November 7th. The Hi-yei was then engaged elsewhere, but nothing had been done to the Saikio, as there was a proposition to leave her as she was, and so to preserve her as a memorial of the action.

After the victory of Hai-yun-tau, no very important events of a purely naval character happened until the eve of the capture of Port Arthur, or, to give it its native name, Lü-shun-Kou. At first, not only Japanese squadrons, but also single Japanese ships, circulated freely in and about the gulf of Pe-chi-li, frequently showing themselves off Port Arthur and Wei-hai-wei, and jealously watching both places. About October 20th,* the Chinese Fleet, having been refitted, put to sea again, the main Japanese force being then in Ping Yang Inlet. Admiral Ting went to Wei-hai-wei, where, on October 27th, he was visited by the British Commander-in-Chief. Meanwhile as the movement towards Port Arthur developed, the Japanese naval strength was more and more concentrated along the coasts of Corea and Shing-king, so that at the close of October, Admiral Ting once more ventured out. Admiral Ito does not seem to have taken any special pains to look for him, but to have confined himself rather to guarding the left flank of the army advancing upon Port Arthur, and to assuring the safe transport of the second army to the neighbourhood of Talien Bay. This army was conveyed in 50 transports from Japan, and began to disembark on October 24th. On November 3rd, Sir Edmund Fremantle fell in with Admiral Ito and visited him off the Elliot Isles. On the days immediately following, the second Japanese army joined hands with the first army near the neck of the Kwangtung Peninsula; and on November 7th, seized Talienwan, Admiral Ito destroying the mines in the bay and capturing some torpedo-boats. At about the same time, Admiral Ting, in obedience to the orders of his superiors, returned to Wei-hai-wei,† where he was joined by a few vessels from the south, vessels, however, of no great force.

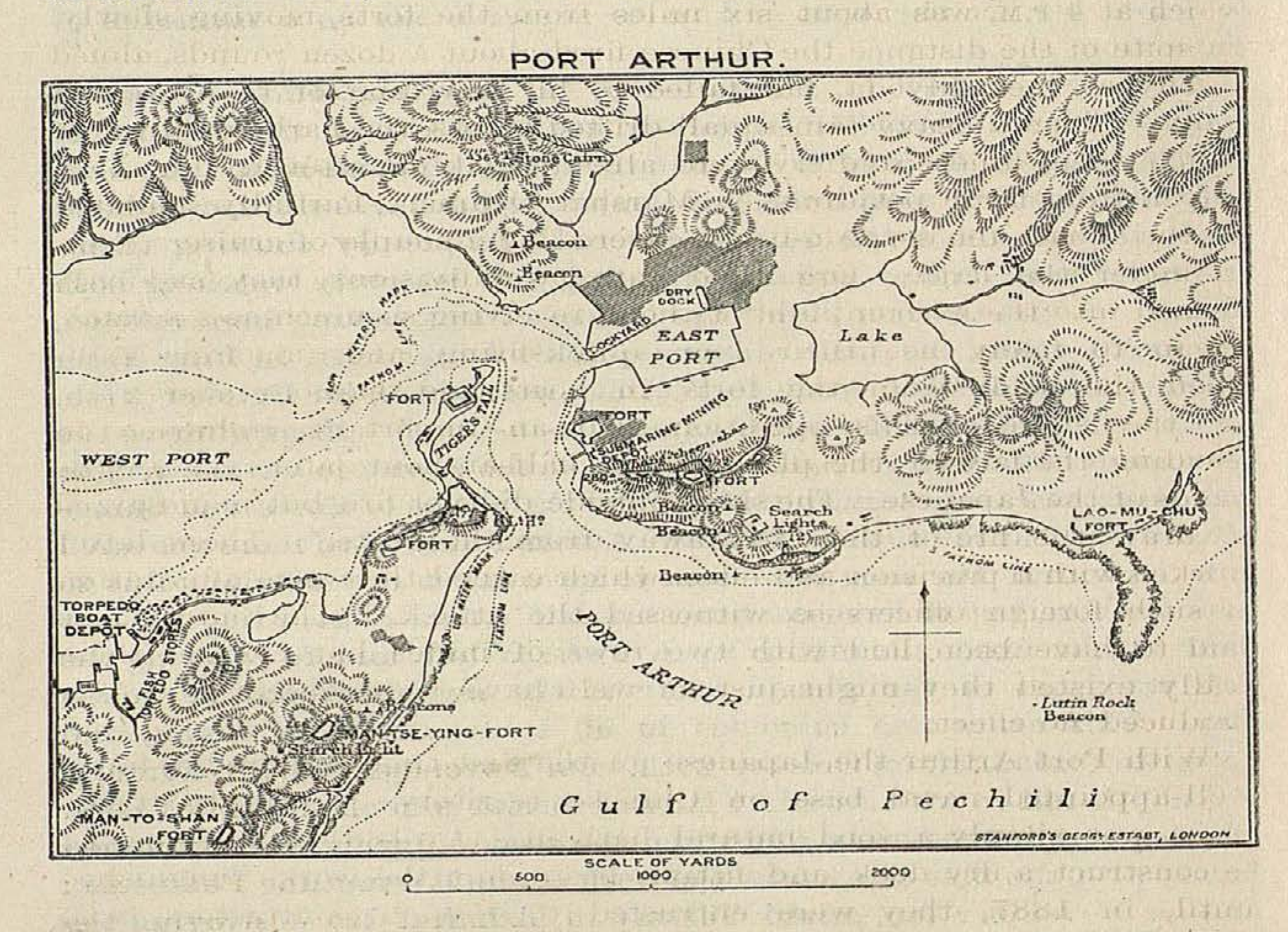
* While the Chinese ships lay at Port Arthur their guns, as a mark of honour, were draped in red. The guns of the Tsi Yuen, which was considered to have disgraced herself, were the only exceptions to this rule.

† In going in the Chen Yuen ran ashore, and so remained for about three weeks. She was then patched up by Shanghai divers and artificers, but was unable to rejoin the fleet until the second week in January, 1895.

The capture of Port Arthur.

While the united armies were still advancing towards Port Arthur, Admiral Ito, having at the moment no more large convoys of transports to look after, steamed across in force, and for a couple of days remained in sight, or almost in sight of the Chinese Fleet, which lay close under the Wei-hai-wei batteries. When he felt sure that it was not disposed to come out, he returned with the bulk of his squadron to Talien Bay, leaving only a few ships to observe the enemy. Moving along the coast westwards he supported the movement of the army on November 20th, and the final assaults on Port Arthur on Novem-

PORT ARTHUR.



ber 21st. On the former day, the fleet seems to have done little beyond keeping itself ready for action and watching Port Arthur, so as to prevent the escape of any vessels that might be within. It moved, parallel with the advance of the army, in line ahead in three divisions, composed as follows :—I. Matsushima, Itsukushima, Hashidate, Chiyoda ; II. Fusoo, Hi-yei, Takao, Yayeyama ; III. Yoshino, Naniwa, Akitsusu, Takachiho, and was accompanied by small craft and torpedo-boats, which, acting close in shore, occasionally threw shells into the Chinese positions.

On the second day, at 6 A.M. the Matsushima, Itsukushima, Hashidate, Chiyoda, Fusoo, Hi-yei, Yoshino, Naniwa, Akitsusu, and Takachiho steamed past the entrance to the harbour, and then returned towards Talien Bay. At 10.30 A.M. the same ships, with torpedo-boats, reappeared, and two of them, the Chiyoda and another, leaving the rest steaming on and off, went round to Pigeon Bay at the back of the peninsula, and at long range and extreme elevation shelled the Port Arthur forts, which, however, from their position they could not see. Later they rejoined the fleet, which at 4 P.M. was about six miles from the forts, moving slowly. In spite of the distance the Chinese fired about a dozen rounds, aimed chiefly at the Chiyoda, but failed to hit anything or to provoke a reply. Then a heavy rain-squall drifted across the harbour, towards which the Chinese soldiery were already making, after having been driven from their positions by Marshal Oyama. Partially sheltered by the squall, ten torpedo-boats, covered by a couple of cruisers, drew in under the land. Organised into two divisions, they suddenly dashed into the harbour, and without receiving so much as a scratch, began to freely use their 1-pr. quick-firing and machine guns upon the soldiers in the forts, in boats and harbour craft, and on the shore. This operation had an important influence in deciding the fate of the place, which, half-an-hour later, was in the hands of the Japanese. The ships outside did not fire, but manœuvred to draw the fire of the forts away from the boats.* These latter worked with a precision and effect which earned the warm admiration of such foreign officers as witnessed the attack. The entrance is said to have been laid with two rows of mines, but even if these really existed they might just as well have been absent, for they produced no effect.

With Port Arthur the Japanese for the first time acquired a fairly well-appointed naval base on Chinese territory. Until 1880 the place was simply a good natural harbour. In 1881 it was decided to construct a dry dock and fitting basin, but the works languished until, in 1887, they were entrusted to French contractors, who completed them in 1890. These works included the dredging of the entrance, the building of a large basin which has 25 feet of water at low tide, the making of fine wharves and quays fitted with steam cranes and railways, and the excavation of a dry dock 410 ft. long by 72 ft. wide at the mouth, and having on the blocks a depth of 26 ft. 3 in. at low water. There is also a small dock for torpedo-

* In these operations the 170-ft. Yarrow boat Kotaka, the only armoured torpedo-boat in existence, bore a distinguished part.

boats, as well as foundries, workshops, and the usual appliances of a modern naval dockyard. All the high ground in the neighbourhood has been well fortified, the works together mounting three 9·8-in., fifteen 8·2-in., thirty 5·9-in., and two 4·7-in. breech-loading guns, besides six 8-in. mortars and numerous field and small quick-firing guns. In the opinion of the British officers who visited the place after its fall, it ought, properly held, to have been impregnable.

The Chinese naval disasters seriously imperilled the position of the gallant Admiral Ting, who would probably have been beheaded had not the foreign officers in the Chinese service unanimously informed Prince Kung that, if the Admiral were punished in any way, they would all resign. His second in command, Commodore Liu, having committed suicide at the time of the running ashore of the Chen Yuen at Wei-hai-wei, was succeeded by Mr. McClure, late master of vessels owned by Messrs. Jardine, Matheson and Co., and also for a time master of the ill-fated Kowshing.

From this point the narrative necessarily becomes somewhat less trustworthy, since at the time of writing only telegraphic information is obtainable in England concerning the occurrences.

The attack upon Wei-hai-wei.

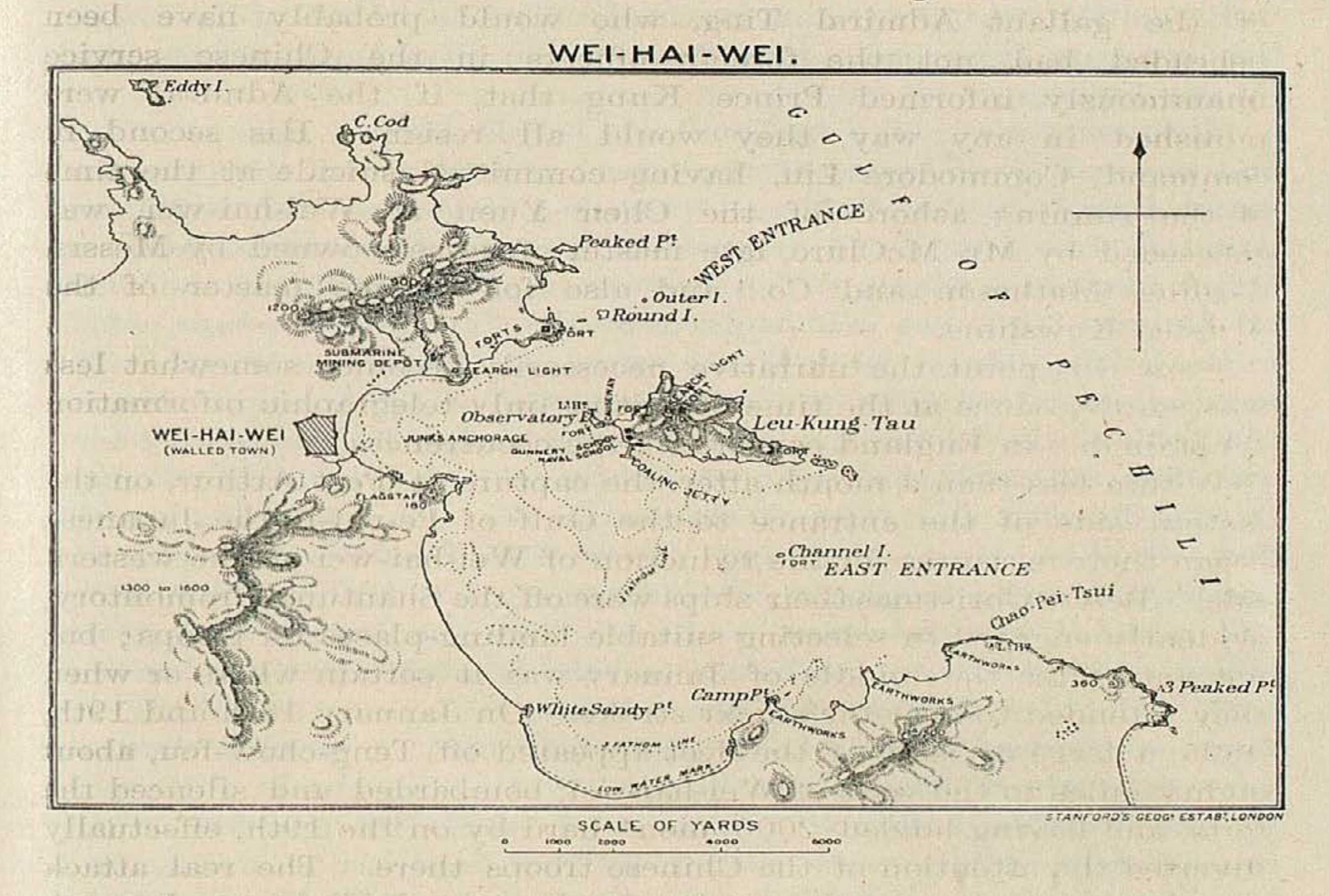
Within less than a month after the capture of Port Arthur, on the eastern side of the entrance to the Gulf of Pe-chi-li, the Japanese began their measures for the reduction of Wei-hai-wei on the western side. Before Christmas their ships were off the Shantung Promontory, evidently engaged in selecting suitable landing-places for troops; but not until after the middle of January was it certain where or when they intended to deal their next stroke. On January 18th and 19th, 1895, a large division of the fleet appeared off Teng-chow-fou, about eighty miles to the west of Wei-hai-wei, bombarded and silenced the forts, and having landed 2000 men* hard by on the 19th, effectually diverted the attention of the Chinese troops there. The real attack was, however, more to the eastward, where, at daylight on January 20th, thirty-five transports, each towing two junks, and escorted by fifteen warships, disembarked part of the third Japanese Army under General Sakuma in and near Yung-ching Bay, thirty miles east of Wei-hai-wei, while on the 24th, the rest of the third army was landed at Ning-hai Inlet, twenty miles west of the stronghold. As soon as these two forces, which were barely opposed, were well established on shore, they began to advance upon Wei-hai-wei

* This force was re-embarked as soon as the other landings had been successfully accomplished.

and to converge upon one another, Marshal Oyama, the conqueror of Port Arthur, presently coming thence to assume command. Meanwhile the warships made Yung-ching Bay their headquarters.

On January 26th there were reported to be nineteen vessels and twenty torpedo-boats there; and at the same time a Chinese deserter declared that eight Chinese warships, with six gun-boats and a number of torpedo-boats, lay between Leu-kung Island and Wei-hai-wei. The island, which is about two miles long, and mountainous,

WEI-HAI-WEI.



stands across the mouth of Wei-hai-wei Bay, to which there are consequently two entrances, an eastern and a western one, and was well fortified. The land sides of the entrances were also fortified, and on hills overlooking the head of the bay there were other works. The place is believed to have been held by 11,000 troops, and there were about 3000 officers and men on board the ships in harbour. By January 29th the fortress was invested on the land side, and on the following day, early in the morning, the Japanese Fleet appeared, and blockaded both channels. On that day and the next the army, assisted by long-range fire from the ships, especially the Naniwa,

Akitsusu, and Katsuragi, carried nearly all the forts on the mainland, and by February 2nd was in possession of the town of Wei-hai-wei itself. Chinese reports assert that a Japanese gun-vessel and two torpedo-boats were sunk during this part of the fighting. In vain did Amiral Ting, on the 30th, land 2000 of his men to help in the defence of the forts. He had to withdraw them almost immediately. His desire had been to demolish all the forts on shore and to hold only the island and the fleet, but he had been overruled by the generals. On February 3rd the Chinese no longer held a single work on the mainland, and retained only the island of Leu-kung, the squadron lying inside it and under the shore forts now manned by the Japanese.

Each entrance to the harbour was barred by two lines of mines, and covered by the guns of the island as well as by the guns and search-lights of the Chinese squadron; yet from the beginning, Admiral Ito determined if possible to send his torpedo-boats to attack the ships within. The first attempt was made on the night of January 30th, but was baulked by the Japanese warships, which mistook the boats for Chinese ones, and fired on them. The next attempt, owing to the awful severity of the weather obliging the bulk of the blockading force to seek shelter in Yung-ching Bay, was delayed until the night of February 2nd, when the Chinese at once detected and stopped the manœuvre. On the 3rd, when the fleet returned, the island and the vessels inside were vigorously bombarded, and a lodgment was effected on the island by bluejackets and marines, who, however, could not take the forts. They maintained their position nevertheless, and the bombardment was renewed with redoubled fury on the 4th. While it was at its height, the fourteen Chinese torpedo-boats in harbour made a simultaneous and very determined attempt to escape, by rushing out at full speed by the western entrance. Some were sunk by gun-fire almost immediately, others were chased by the Japanese cruisers for a considerable distance, and, for the most part, gradually overhauled and destroyed. Two only seem to have finally got away. Some of the boats while passing Chefoo, appear to have wantonly fired upon the town, though it is possible that they believed it to be in Japanese hands.

On the night of the 4th, the Japanese boats were again employed. Three divisions of five were utilised. The second and third attacked,* approaching very slowly and carefully through the eastern entrance,

* Among the boats in the divisions actually engaged are reported to have been Nos. 2, 6, 8, and 10.

while the first created a diversion at the western one. The cold was so intense that during the approach a lieutenant and two men were frozen to death at their posts. Indeed, for days all the ships engaged had been covered with ice. This effort, though it had good results, was an expensive one. Of the ten attacking boats only one returned uninjured. The boiler of one, struck by a shell, exploded ; another was sunk, and eight men were drowned ; three, while endeavouring to get out of the fire which was hurled at them, went ashore ; and two smashed their screws among the obstacles at the entrance. Moreover, one received forty-seven and another ten projectiles. But there was much less loss of life than might have been expected, and most of the damaged boats were subsequently taken to Port Arthur and repaired. On the other hand, the Ting Yuen, which had so long been Admiral Ting's flagship, was sunk, and the Ching Yuen, though the injury was not fatal, was torpedoed. The Chinese Admiral, whose splendid resistance extorted the admiration of all, escaped, and transferred his flag to the Chen Yuen. On the night of February 5th, after the bombardment had been continued all day, Admiral Ito ordered a fourth attack to be made. This time what remained of the second and third divisions, reinforced by other boats, watched one entrance, while the first division entered by the other. Among the boats mentioned as having participated in the adventure were the Kotaka and Nos. 11 and 15. The division suffered no casualties whatsoever, and appears to have sunk two vessels, alleged to be the Lai-Yuen, and Wei Yuen, the latter a training ship for seamen (1200 tons), and to have injured a third, discharging seven torpedoes in all. The defence was now very materially weakened. On the 6th, further landing parties were thrown upon the island of Leu-kung ; during the bombardment of the 7th, the magazine of one of the island forts was blown up. On the 8th, the last Chinese positions, except one fort on the island, were stormed or silenced ; and on the 9th, the Ching Yuen, already disabled, was sunk by gun-fire from the shore, and all the remaining wires of the western mine-field were cut, and the obstructions destroyed. Still Admiral Ting held out. But on February 12th, he sent a gunboat under a flag of truce to Admiral Ito, offering to surrender, if the lives of all engaged in the defence were guaranteed. Admiral Ito made such a reply as was to be expected but when his messenger boarded the Chinese flagship it was discovered that the brave Ting, unable to bear the humiliation, and knowing well that his own countrymen, for whom he had fought so stoutly, would be much less merciful than the enemy, had, together with several of the land and sea officers, committed suicide. The negotiations were, consequently, continued with the second in com-

mand, Admiral McClure, and in due course the surrender was effected. The Chen Yuen was found to be the sole Chinese warship still in a condition for service, but, in addition to her, there fell into the hands of the captors—the Tsi Yuen, Ping Yuen, and Kuang Ping, and the six 440-ton gunboats—Chen Pien, Chen Pei, Chen Chung, Chen Nan, Chen Tung, and Chen Hsi.* Most of these were dispatched to Japan on or soon after Feb. 16th, and immediately afterwards the victors began to raze the shore fortifications of Wei-hai-wei.

The captors behaved most handsomely, liberating the prisoners, with a single exception, paying all honour to the dead Admiral and his subordinates, and sending their remains, under a salute of minute guns, to Chefoo. The only prisoner not liberated was an American subject named Howie. This individual, with another man named Browne, had gone to the East with the intention of offering their services to the Chinese Government for the blowing up of the Japanese Fleet. Howie had commanded the Nictheroy during the Brazilian insurrection; Browne had invented a powerful liquid explosive. China had paid them 100,000 dollars down, and promised them large rewards in case they were successful. They went from San Francisco to Yokohama, arriving on November 2nd, and, going on in another vessel to Kobe, were arrested there with their contracts upon them, but were liberated upon giving their parole not to assist the Chinese during the war. Yet in January Howie appeared at Wei-hai-wei, and subsequently took part in its defence.

That Admiral Ting had not misunderstood the brutal vindictiveness of his countrymen was proved a few days later, when the Emperor not only decreed the death of all who had taken part in the defence, but also authorised the Governor of Shantung to behead the unhappy people without following the usual course of first reporting to the throne. The Admiral, had he survived the surrender, would doubtless have been treated like the rest, if not with even greater cruelty; yet he was a man who had never disgraced himself, and who had long devoted himself more assiduously than any other native to the welfare

* The following is, therefore, the extent of the Chinese losses in warships (exclusive of about fifteen torpedo-boats sunk or captured) up to this stage of the war:—Dispatch vessel, Tzan Chieng, taken July 25th; cruiser, Kuang Yi, run ashore and destroyed July 25th; belted cruiser, King Yuen, sunk Sept. 17th; cruiser, Chih Yuen, sunk Sept. 17th; cruisers, Chao Yung and Yang Wei, destroyed Sept. 17th; cruiser, Kuang Chia, destroyed Sept. 23rd; battleship, Ting Yuen, torpedoed Feb. 4th; belted cruiser, Lai Yuen, and training ship, Wei Yuen, torpedoed Feb. 5th; cruiser, Ching Yuen, sunk Feb 9th; and the ships above mentioned, which were taken on Feb. 13th. All the Chinese vessels engaged both at Asan and at Hai-yun-tau, therefore, as well as others, have been lost or taken, and the Chinese fleet had practically ceased to exist.

of the Chinese Fleet. In the days of Admiral Courbet's campaign in China he had commanded the Pei-ho Squadron; he had shown a most brilliant example both at Hai-yun-tau and at Wei-hai-wei, and though he had not been successful, he had probably done all that any Chinese officer could have done with the men and materials placed at his disposal by a corrupt and sleepy Government. The numerous European and American officers who have known him had, one and all, the highest regard for him, and will, one and all, regret his fate.

W. Laird Clowes.

CHAPTER VI.

Lessons from the War in the East.

The general peace of the world has been but little disturbed during the last fifteen years; but it is just during those fifteen years that so much progress has been made in the development of war material —especially of the class of material devoted to naval operations. The three principal features of improvement are: higher speed, large quick-firing guns, and smokeless powders of great power. There has been, of course, progress in other accessories of war, all helping towards the advance of the general line, but it is the three just mentioned that have been looked on as likely to cause another of those "revolutions in naval tactics" of which one hears so often. All improvements in war-like material, however, remain in a more or less tentative stage until they have passed through the ordeal of actual warfare. Experiments may be extensively carried out, and useful experience may be obtained during peace time, but it is actual war alone, and war between well-matched nations, that really decides the advantages and disadvantages of developments in the machinery of war. The Chilian and Brazilian revolutions gave us many important lessons, but in both cases the Navies were ill-matched, and the lessons were incomplete; hence the reason that the eyes of the whole world have been strained towards the Far East, in order to learn what there is to be learnt from the war between China and Japan.

Relative strength of combatants.

This war opened, and has been conducted, under circumstances which have very much enhanced the interest taken in it by outsiders. Compared with the 350,000,000 inhabitants of China, Japan is a small nation, numbering about 44,000,000; and, speaking broadly, it might be almost laid down as an axiom that one country could never conquer another whose population was so vastly superior in numbers. This was a favourite maxim of Napoleon, a close observer of war-like conditions, who maintained that the 30,000,000 of France must be able to overcome the 15,000,000 of England. And yet he proved wrong. England's insular position, and, above all, her command of the sea, gave her greater advantage than the extra millions of France; just as superior arms and organisation enabled England to conquer India, Spain to conquer Mexico and Peru, or

Rome to conquer the world. The result of the Chinese-Japanese war, so far as it has gone, is only another instance of the importance of the command of the sea, of superior war-like material and of superior organisation. Japan in the Pacific occupies a somewhat similar position to England in Europe. Both countries are island kingdoms, to whom the first consideration of war must be superiority over the enemy on the seas. Most wisely Japan foresaw this, and for years past she has strained her resources to obtain that superiority, without which her present successes must have been turned into appalling disasters; for Japan conquered by China would have been even more terrible than China conquered by Japan.

Manufacture of guns in China.

Some years ago (1880–1886) the Chinese very much strengthened their Navy, and showed signs of a determination to maintain the lead. They also established an arsenal at Kiangnan, which is certainly capable of constructing war-like material on a more extended scale than can be done in Japan. Indeed, at Kiangnan modern breech-loading Armstrong guns of 12-in. calibre and 35 calibres length have been constructed, besides 4·7-in. quick-firing guns on the same design as those used in the British Navy. These guns have all given good proof results,* although there can be no doubt that their production in China must have proved very much more costly than their purchase in Europe would have done.

Preparations for war.

There is no doubt that China with her greater wealth could, by judicious expenditure, have prevented Japan from obtaining the mastery of the seas, and by a few millions spent during peace time could have avoided her present position, from which not even the expenditure of a thousand times as much can extricate her. Here is the most important lesson for Englishmen to learn, lying at the threshold of the consideration of the war; and it is to be hoped that this lesson has now been taken to heart by the nation. If so, those immediately responsible for the administration of our Navy will no

* *Extract from a private letter from an Englishman serving the Chinese*:—"You may perhaps have noticed that the Japanese Fleet attacked Wei-hai-Wei on the 9th August. The attack was made chiefly by one vessel, only at a very long range, as none of the projectiles reached the shore. After about an hour's firing the attacking vessel moved off to the eastern entrance and concentrated its fire on a new lightly-armed fort, mounting, according to *their information*, three 12-c.m. or 15-c.m. ordinary guns. The Chinese, however, had mounted, only a day or two before, two of the 12-c.m. quick-firing guns, made in this arsenal. The Chinese first replied to the Japanese fire with the old guns, but after a few rounds two of them jammed in the breech wedge. It was not until this happened that the General (Liu) turned his attention to our guns. To his great surprise the first round went clean over the Japanese vessel, and before she could get out of the way these Chinese gunners, who had never seen these guns fired, managed to strike her three times out of seven rounds fired. One of the rounds evidently disabled the Japanese ship, as she had to be taken off in tow of a couple of her consorts. The directors of the arsenal are very much pleased at the result, especially as they have received flattering despatches from General Liu. . . ." It is only fair to remark that the report of disabling the Japanese ship has never been confirmed.

longer be hampered in their efforts to maintain it in efficiency by considerations of finance.

Looking back at what has taken place during the past few years, it seems as if China, having procured a good Navy in 1886, and having taken steps to give her naval officers a certain amount of instruction in the preparations for war followed by European nations, put the matter out of mind, and never considered the necessity of keeping pace with the times. Such is, after all, exactly the character of the Chinese nation. They are pre-eminently conservative. By fits and starts they may be induced to adopt some of the modern appliances or customs of more advanced nations; but to maintain a continuous effort after improvement is altogether contrary to their nature. Most of the foreign instructors, who were to train their seamen and officers, soon became irksome to the Chinese, and felt obliged to resign their posts, but not before they had seen enough of the Chinese seamen to recognise that they were capable of being made into first-rate men-of-war's men. No one can read of General Gordon's exploits during the Taiping rebellion without observing what good fighting material the Chinese people can supply under leaders worthy of their men.

Chinese *personnel*.

Everyone has admired the pluck with which the Japanese soldiers and sailors have behaved; it would be a bad compliment to them to suppose that the Chinese lack pluck when they are well led, and are not demoralised by fighting on the losing side. A disheartened man ought to be clearly distinguished from a coward. It is not necessary to go to China to find instances of men behaving badly after a series of defeats which have taught them that they are inferior to their enemy in weapons as well as in skilful leaders. From the accounts of the Kowshing affair it is perfectly apparent that the Chinese entered into the war with pluck and determination. The Chinese Navy suffers under a very great disadvantage from being divided into fleets which are quite distinct, one from the other, in administration, equipment, and every detail. A mobilisation of these fleets must have nearly all the disadvantages proverbial to the combination of fleets of allied Powers.

Japanese *personnel*.

It is undoubtedly in their officers and in discipline that the Japanese are superior to the Chinese. The former, in their determination to create a strong Navy, left no stone unturned: they sent a number of their officers to various European countries with a view to studying naval matters. At the same time European officers were engaged to advise and instruct in Japan; and, unlike their rivals, the Japanese have steadily maintained the progress thus initiated. The result has been that in matters of discipline their Navy is equal

to any navy in the world. In physique the Japanese sailor, though as hardy, is probably on the whole smaller than the Chinese, for amongst the latter the northern tribes have contributed men of large stature; but individual strength has ceased to play an important rôle in modern warfare. To sum up, it may be said that anyone who has spent some time on board Japanese men-of-war, would be struck by their excellent and *intelligent* good order. Their guns are kept clean everywhere and in good working order—not polished up outside whilst the bores are rusting. Their officers take a pride in understanding all the details of their ship, and the men are clean and smart; in fact, the *personnel* is as good as could be desired.

It appears, therefore, that the Japanese had the advantage in *personnel*: on account of greater homogeneity in the Navy; on account of the officers being more highly trained; and on account of the confidence inspired by the knowledge that they possessed superior weapons. To these advantages may be added a far higher sense of patriotism than exists in the enormous empire of China, which is made up of provinces having little in common one with the other.

The fleets compared.

With regard to the number of men-of-war possessed by each nation, and fit for active service, the total seems to have been about equal, but the differences in their qualities were most marked in certain characteristics. The Japanese were superior in offensive power, while the Chinese had a superiority in defensive power, for at Yalu they possessed four ironclads (two feeble ones), a class of ship unrepresented in the Japanese Fleet, unless the old Hiyei of 1878, having a $4\frac{1}{2}$-in. belt, or the still more ancient Fuso, can be so described. The speed of a fleet is measured by the speed of the slowest ship; and it might be argued that the splendid speed possessed by such a vessel as the Yoshino was of no use if she formed one of a fleet in which a slow ship had a place. If this be true for the battle of Yalu, it must be remembered that the Yoshino figured in other fights when her speed proved of the greatest value, for it has been reported that for twenty consecutive days this vessel made use of forced draught during periods of more or less duration. The speed of the Japanese Fleet, taken as a whole, at the battle of Yalu, was, however, so far superior to that of the Chinese Fleet, that the former was able to steam round the latter two and a half times during the action; and, what was most important, the Japanese were able to choose their own distance from the enemy, an advantage of which they made good use. This superiority of speed is not very marked if the latest individual ships of both fleets are considered, for the Chinese Chih Yuen and Ching Yuen each steamed 18·5 knots, and the Chao Ying and the Yung Wei each 16·5 knots;

whilst the Japanese Yoshino steamed 23 knots, the Chiyoda 19 knots, the Naniwa * and Takachiho each 18·75 knots, and the Tsukushi 16·5; but these are trial-trip speeds, and if the Japanese had the superiority of speed of fleet attributed to them, it is a proof that they had taken better care of their ships since their purchase. In both fleets, however, the fastest ships were crippled in speed by having old and slow ships in company.

Quick-firing guns.

But the striking difference between the two Fleets lay in the fact that the Japanese, following the improvements introduced to Western Navies, had armed their ships with large quick-firing guns. There were no less than seventy-one of these weapons on board their ships at Yalu. Whereas there was not a single one on board the Chinese Fleet. They had been introduced since the spasmodic effort of the Chinese to strengthen their Navy, and in not following up improvements quickly the Chinese allowed their enemies a great advantage. It must not, however, be supposed that the Chinese were altogether blind to the importance of quick-firing guns. Far from it, for they purchased such guns from various European firms, and after due consideration, having selected the Armstrong gun as their type, they commenced to manufacture them, for their Southern Fleet, in the Kiangnan Arsenal, as already mentioned. Some guns were actually finished, but were not mounted afloat, and it was the delay and hesitation more than blind neglect that allowed the Fleet to be without them. That the Chinese should have acted thus, with the activity of the Japanese in this direction before their eyes, seems extraordinary, and their conduct can really only be accounted for by putting it down to the conservatism of the national character.

The Japanese, on the other hand, just waited to see the large quick-firing gun approved for the British Navy, and then began to order them in considerable numbers from Elswick. The first of their ships so armed was the cruiser Chiyoda, which left the Clyde in January, 1890. Then the coast-defence ships Itsukushima and Matsushima, built at La Seyne, Toulon, received twenty-three 4·7-in. quick-firing guns between them, eleven more going at the same time to a sister-ship building in Japan. Shortly afterwards the Yoshino was built and armed with 6-in. and 4·7-in. quick-firing guns by the Armstrong firm, and more quick-firing guns were despatched to Japan to form the armaments of cruisers building or re-arming in that country. Lastly, the Tatsuta, a large torpedo-catcher, was built and armed at Elswick; but although she left

* "Khan," which generally follows the name of Japanese men-of-war in English publications, simply means "war-vessel."

England before war was declared, she has been detained at Aden, and has done no fighting.

The general result of all the improvements embodied in a quick-firing gun is that from a 4·7-in. quick-firing gun about eight or ten aimed rounds a minute can be fired, and from a 6-in. quick-firing gun about five or six, whereas in old breech-loading guns of the same size the maximum speeds of firing were about one round per fifty seconds and one round per minute respectively. It may therefore be said that a quick-firing gun can fire about six times as rapidly as an ordinary breech-loading gun! The Japanese went into action, therefore, armed so that they could fire six shots for every shot from the Chinese ships! Of course, the full speed of firing should only be used during critical moments; but the power of being able to employ it gives an inestimable advantage, and also points to the fact that the guns require very little labour to work them at moderate speed. Apart from rapid firing, the new guns are longer and more powerful than the old, especially if cordite be used with the former. The Yoshino carried cordite for her guns.

Modern large guns carried at Yalu.

Besides quick-firing guns, four Japanese ships at Yalu each carried one 66-ton 12·6-in. calibre (32-c.m.) gun made by the Forges et Chantiers Company. As no special mention has been made in any of the correspondence so far published, of the damage inflicted by these guns, it is difficult to determine what part they played in the action, but they are much slower to work than our English guns of similar size,* and cannot have fired more than one round per five minutes. Nor do they favourably compare in power with our new guns firing cordite, for the Japanese have only brown prismatic powder, which they adopted in preference to the French Bn., after trial had shown that the latter caused rapid erosion of the bore. Moreover, a fragment of a Chinese shell stuck in one of the hydraulic pipes of the 66-ton gun mounting on board the Matsushima, and this had to be repaired before the gun could be brought into action again, for the mounting cannot be worked by hand-power exclusively. The repair to the pipe did not take long, but before it was completed a terrible concussion, caused by the bursting on board of a 12-in. shell from the enemy, which in its turn exploded a lot of cartridges, threw the breech-gear of the gun into disorder, and after this it was only with difficulty and patience that any more firing was done from it. As this mishap occurred during

* On board the Royal Sovereign seven rounds have been fired, during prize-firing, from her 67-ton guns in twelve minutes, with six hits. An equally good record has also been obtained on board the Empress of India. In each case the range varied from 1600 to 2200 yards, and the ship steamed at eight knots. With the new 12-inch guns a much higher speed of firing is expected.

the beginning of the action, the Matsushima's large gun was not able to do much service, and she was practically left to fight on with her 4·7 quick-firing guns only. Leading the second division with Admiral Ito's flag flying, she was picked out as a target, and struck several times, the combined explosion of the shell and cartridges alone causing her a loss of thirty men killed and forty wounded, besides wrecking all her internal fittings. She had to leave the Fleet after the battle.

It has already been said that the Chinese at Yalu did not carry any large quick-firing guns. They, however, carried the smaller description—three and six-pounders—which are very murderous weapons if well served at moderate range. At the range chosen by the Japanese these guns are not likely to have played a very important part, and, moreover, the Japanese were better provided with them than were the Chinese. On board the Chinese Fleet there were however, some large breech-loading guns of Krupp and Armstrong manufacture ; but neglect, or worse, had deprived even these guns of half their power for destruction, there being only a few shell for them in the whole fleet. Consequently, when these were expended, solid shot, which are very ineffective against unarmoured vessels, had to be used. One of the 12-inch Krupp projectiles penetrated the side of the Matsushima, passed just underneath a loaded Whitehead torpedo, went through two store-rooms and a large oil tank, and was at last stopped by the armour round the after barbette. The projectile broke up, and proved to be a common shell filled with *cement*. Had it contained powder and burst in the vicinity of the torpedo, the latter would probably have been exploded and the Matsushima destroyed. The oil tank was immediately above the engines, which were consequently deluged with oil.

Thus, with superior *personnel*, higher speed, and more powerful guns, the Japanese could well afford to let the Chinese have a slight advantage in defensive armour on board four small ironclads.

Fire in action.

The Japanese freely attribute their success at the battle of Yalu to their quick-firing guns, and have since reported on them in the highest terms of praise. They manœuvred their fleet so as to obtain as much from this superiority as possible, for by keeping at a range of not less than 2000 yards they made the battle a gunnery contest, and by the excellence of their training and material, they succeeded in constantly setting fire to the enemy's ships. It is true that one or two of the Japanese ships were also set on fire, but the fires were not of anything like such frequent occurrence, and it appears that they had a better fire service than the Chinese, and more easily extinguished the flames. There is an important lesson

to be learnt here. The Chinese found that hammocks, sails, or any inflammable materials were sure to be set fire to. A fire in action is, to say the least of it, a very demoralising occurrence, and Yalu shows that it must be expected. It would be interesting to know if all the ships followed the ancient rule of thoroughly wetting their decks before the action. Should we not endeavour to minimise this danger of fire by keeping our ships as clear of inflammable material as possible, abolishing wooden ladders in favour of iron ones, and dispensing with all that pretty moulding overhead, so dear to the heart of the artistic joiner? Even hammocks might possibly be constructed of less inflammable material than they are at present.

The Chinese are reported to have left their boats in harbour. No doubt they acted wisely, for even if the boats are not struck by hostile shot they will probably be rendered useless by the concussion of the guns of their own ship. This was amply proved at Alexandria, for after the bombardment some of the captains had difficulty in finding a boat to convey them to the flagship. The boats, if retained, must be a source of splinters, and very likely of fire. They are therefore, from every point of view, better away from their ships, and if possible, should, before an action, be lowered and put in charge of a few men, to be picked up by the victor when convenient. In our modern ships special attention is paid to the fire service, so that should a fire occur in any part whatever of the ship, ready means are at hand to extinguish it.

Concentration of fire.

The Japanese gunnery gives rise to a suggestion respecting the concentration of fire which is worthy of notice. In the days of weather and lee gauge it was possible to cut off a portion of an enemy's fleet and concentrate the guns of several ships on that portion with the idea of destroying it, before the remainder could beat up to its relief. With steam ships such a manœuvre is impossible; but why not concentrate, as far as practicable, all the guns of your fleet on a particular ship of the enemy's? One crippled ship is a terrible drawback to a fleet, as all their tactics must be deranged in order to protect that ship, and more advantage would probably be gained by such a system of attack than by each ship firing indiscriminately at the nearest enemy.

Torpedoes.

It is rather a remarkable feature of the battle of Yalu, and indeed, of the whole war, until the closing scene at Wei-hai-wei, that torpedoes have played so small a part in it. We hear of the Chen Yuen firing "one torpedo, which, however, missed its mark," a very unusual record of the performances of those complicated machines. A torpedo-boat also did its best to sink a Japanese ship by firing two or three torpedoes at her, but, although the range was short, they gave no

better account of themselves than did the Chen Yuen's torpedo. Again, the Japanese finished off a Chinese ship with a spar torpedo. In the commencement of the war under discussion a torpedo was fired by the Naniwa at the Kowshing. Whether the torpedo did its work or not seems doubtful; in any case the Naniwa thought it advisable to assist the torpedo by firing her guns at the unfortunate transport; and the guns could have done all the work at much less cost. Thus the only records of work done by torpedoes is the sinking, or rather the assistance to sinking, of vessels which were completely helpless and inoffensive. No doubt at Yalu the Japanese admiral preferred to keep out of the range of torpedoes, so that the battle might be decided by guns, in which he had so marked a superiority, rather than by torpedoes, in which the ships of his fleet were little, if any, better than the Chinese. No Japanese torpedo-boats appear to have been present, but in one account it is stated that several Chinese torpedo-boats appeared towards the close of the battle, and rather than meet the new danger, when the men were exhausted with a long day's fighting, the Japanese Fleet avoided them. This account may be true, although it has not been confirmed, and the end of an action is certainly the best time for torpedo-boats to appear. The action never seems to have become a *mêlée* in which torpedo-boats might have had a chance, and for the same reason no case of actual ramming took place, although one abortive attempt is reported.

At Wei-hai-wei the torpedo work is also disappointing. The Japanese fleet was just in the position for a Chinese torpedo-boat attack, but none is recorded. The attacks on the Chinese fleet seem to have been carried out with determination and pluck by the Japanese boats, which suffered severely. They, however, only succeeded in sinking two ships of a crippled fleet. This is a very different record to those fancy pictures which are so often drawn of a host of torpedo-boats steaming amongst their enemies' ships and sinking them right and left!

Considerations of speed.

It is evident that the Japanese tactics at Yalu would have been ill-advised had they not possessed considerably higher speed, as a fleet, and superior gun-power. An attempt of one fleet to circle round another, would, one naturally thinks, give just the opportunity required for the inner fleet to cut off a portion of the outer, and to bring the ram into operation. Indeed, it can hardly be said that the Japanese, with all their superior speed, avoided this, for they were very near losing the rear ships of their fleet, between which and the main body some of the Chinese managed to get. The Japanese, in leaving their old and slow ships at the end of their

line, were ill-advised. These ships crippled the faster ships with which they were in company to such an extent that they were probably a source of weakness to the fleet, which would have done better without them.

It will be remembered during the "scare" of 1878, when the British Fleet were ordered from Vourlah Bay to the Dardanelles, how much the slow old Research hampered the movements of the fleet. Again, during the manœuvres of 1887, Commodore FitzRoy's Fleet was destroyed (theoretically) simply because they had the old Shannon hanging on to their heels. In war time consideration must be given to this point. It is most wrong that an Admiral should be placed in the position of having either to desert a lame duck or risk the loss of a fleet action. In the composition of fleets as great an equality in speed as possible should be arranged for.

The old theory that a vigorous offence is the best defence was emphasised at Yalu, where cruisers well armed with quick-firing guns did not hesitate to engage in the line of battle against ironclads; but this course would wear a different aspect if the ironclads were properly armed with a secondary battery of quick-firing guns.

End-on *v.* broadside fire.

No one can study this fleet action, the first after a long interval, without considering the value of end-on *v.* broadside fire. Is not too much now sacrificed to the end-on fire principle? A ship should, of course, have all-round fire, but it is the broadside which must decide an action, especially a fleet action. Moreover, a ship end-on really affords a much better target than a ship broadside-on, for all the difficulties of shooting lie in the range, and a shot which would pass over a ship were she broadside-on would very likely strike her if end-on. The end-on ship gives, in fact, a margin of 100 yards more range to the gunner, and there is never any difficulty in making good shooting as far as horizontal error is concerned, for the beam of a ship is at least 40 ft., which is target enough for any experienced man. In the old days every effort was made to avoid the end-on position for fear of being raked, and our ancestors had more experience of war than we have. Why should we take a different view from them, and, in preparing our ships for end-on fire, invite that very danger of being raked which in a modern cruiser would be just as serious as in an old frigate? Moreover, if in a duel both sides selected an end-on attack, it must soon be converted to the broadside.

In the wars of the French Revolution, the French adopted the broadside defence against the end-on attack on several occasions with success. Rodney's, St. Vincent's, and Nelson's plan of concentrating their fleets on a portion only of the enemy's fleet counteracted the

advantages of the French system. In these days of steam the concentrated attack could, however, be always foiled, and probably the old broadside-defence formation (line ahead or quarter-line) would be the best to adopt; but, whether the action was opened in this formation or not, it must soon develop into an exchange of broadside fire in fleet actions as well as in duels.

Tactics at Yalu.

This reasoning is fully borne out by the battle off the Yalu. The Japanese adopted the "line ahead" formation, and the Chinese went to the attack in columns of divisions line ahead, keeping a course about at right angles to that of the Japanese. In doing this the Chinese were compelled to open the attack by opposing end-on fire to broadside fire, just as the English fleets did when engaging the French during the wars of the Revolution. The Japanese held their course past the Chinese, and as soon as the latter saw this they should have changed their formation to line ahead, and brought their broadsides to bear against the Japanese ships. They did not do so, apparently, because Admiral Ting had not proper control over his fleet. Thus the Japanese were able to steam round to the flank of their enemy, whose formation began to approach line abreast, and to concentrate their fire on the flank ship. After this, the Chinese fleet got into disorder and as each ship was left more or less isolated, so she became the object on which the Japanese concentrated their fire. In fact, one fleet was always under control, and the other was little better than a crowd of ships, some of which often masked the fire of others, and one of which actually rammed a consort.

The attempt to cut off the Japanese rear ships was the only tactical operation the Chinese undertook. It was thwarted by the prompt support Admiral Ito was able to give the beleaguered ships. The Japanese tactics were excellent when compared with those of their opponents—that is to say, they were good enough for the occasion, but there is nothing special to be learnt from them.

Auxiliary armaments.

All modern battleships are designed to carry powerful auxiliary armaments—that is to say, their heavy guns are supplemented by a battery of comparatively light quick-firing guns. The wisdom of this measure was fully proved at the battle of Yalu. Had the Matsushima carried no such light guns, she would have been practically useless as soon as her large gun was so seriously damaged; as it was, she was able to give a good account of herself even after that catastrophe. But we have another lesson to learn here, or rather the importance of a lesson already learnt in the English Navy is emphasised. This is the necessity of providing an alternative means for working heavy guns, and not leaving them so dependent

on power (hydraulic in the case of the Matsushima) that a fragment from a shell shall disable them by striking one pipe. All British ships that carry guns worked by hydraulic power have their main pipes in duplicate, but in addition to this, the new battleships will be provided with heavy guns (12-in.) which can be entirely worked by hand as well as by power.

Speed of firing.

It would be most interesting to ascertain what speed of firing was obtained from the quick-firing guns during the moments of hot action at Yalu. We are never likely to get any accurate information on this subject, as—perhaps unfortunately in the scientific interests of lookers-on—those who fight battles have other things than record-making to think about, but we can make some sort of an estimate. The battle lasted about four and a half hours (12.30–5), and if we take one ship, the Yoshino, into consideration, we may assume that intervals in the firing occurred, giving an aggregate of about one-and-a-half hours, leaving three hours during which she maintained a more or less hot fire. Now the tactics pursued by the Japanese admiral were such as, generally speaking, to bring only one broadside into action at a time; the Yoshino was armed with twelve guns, but two of them were carried on the middle line, so she was able to fire seven guns on each broadside. During the action she must have fired about 1200 rounds, that is, an average of 170 rounds per gun; and this having been accomplished in three hours, gives nearly one round per minute per gun as an average rate. We have more information respecting the Chinese rate of fire, for we are told, in the letter published by the *Times* of September 28, that "the two ironclads fired 197 rounds from their 12-in. guns, and 268 rounds from their 6-in. guns." Thus eight 12-in. Krupp guns each fired twenty-five rounds, and four 6-in. guns each fired sixty-seven rounds in the three hours. We are specially informed that none of these Chinese guns were disabled; on the other hand, there is reason to believe that some of the Yoshino's guns were struck and disabled, which would give a higher average to the remainder.

Damage to guns from hostile fire.

Referring to this question of damage to guns from hostile fire, the following incident may be considered of interest. A heavy (12-in.) Chinese shot struck one of the Japanese 4·7-in. quick-firing guns, causing it to bend considerably, and completely tearing off the breech ring, which is a steel ring shrunk on to the breech of the gun and forming the connection between the gun and the piston-rod of the recoil press. The gun was loaded when the accident occurred, and a Japanese officer, who was standing near at the time, thought it desirable to withdraw the charge, if possible. To his surprise, he

found that, in spite of the damaged condition of the gun, he was able to open the breech and take out the cartridge with ease. The breech-ring remained attached to the piston-rod, and the latter received no damage. Many guns were struck by hostile projectiles as was to be expected, but an argument might here be discovered in favour of arming such vessels as torpedo-catchers with several small guns, say twelve-pounders, which are quite powerful enough, rather than with one or two heavier guns, for with a numerous armament of guns, it is obvious that no single shot from the enemy could damage so large a proportion of your offensive power.

Accuracy of fire.

The modern quick-firing guns ought to have given to their Japanese possessors another advantage over the older guns, namely, that of greater accuracy of fire. To what extent this was actually realised cannot yet be told, for the battered condition of the Chinese ships could be accounted for by the great number of shots fired by their adversaries without implying that the guns were particularly well directed. But it is well to draw attention to the improvements recently made with a view to securing a greater accuracy of fire, and the success with which these efforts have been rewarded. The quick-firing guns are mounted on carriages specially designed for easy manipulation, and the man who fires the gun, trains and elevates it himself; he has, therefore, no excuse for firing until the gun is properly laid. When he does fire, he has only to press an ordinary trigger in order to complete the electric circuit through the primer in the cartridge. In the old system of percussion, or concussion, firing it was necessary for the firer to give a sharp jerk to a lanyard, an exertion which required a certain amount of time, and almost necessitated his taking his eye off the sights. The French Navy adheres to percussion firing, not having, so they say, sufficient confidence in the certainty of action of electric firing. It is rather curious that, in spite of their want of confidence in the power of electricity to perform with certainty the most simple function for which it can be used, the French are now the leading advocates for the adoption of electric machinery of a most complicated nature to work turrets and heavy guns. This machinery has yet to be proved; but electric firing has been successfully tried for years in most navies. It was exclusively used with the Japanese quick-firing guns, and has been most favourably reported on. This is, however, a digression; let us return to the discussion on accuracy of fire.

The introduction of aiming-tubes has perhaps done more towards the improvement in shooting than anything else. With these tubes and their miniature ammunition the men can be

frequently exercised in aiming in a manner which is interesting to them, and inexpensive to their Government. Our own Admiralty have wisely granted a liberal allowance of ammunition for the aiming-tubes, and the frequent exercise with them carried out on board our ships has borne good fruit, as the following results of prize-firing will show. On board the Royal Arthur eighteen rounds were fired from a 6-in. quick-firing gun in three minutes, fourteen hits being made; on board the Blake eighteen rounds with fifteen hits in the same period and from a similar gun, and an average of 14·8 rounds per three minutes was made from ten of the 6-inch guns of this ship, with 110 hits; in every case the ship steamed past a target at about 8 knots, so that the bearing and distance of the target was constantly varying. The Royal Sovereign and many other ships have sent in reports as good, or nearly as good, as those quoted, thus marking in the most practical manner the progress that has been made. The Japanese fully appreciated the value of aiming-tubes and had them supplied to all their ships. It is of course unlikely that the Japanese ships exercise their guns as frequently as British ships do, but the infrequency of such exercise on board the Chinese ships is drawn attention to by the circumstance, mentioned in so many reports, of officers being thrown off the bridge by the concussion from their own guns. Had exercise not been unusual, or had it been carried out under the supervision of the superior officers, the danger of the position on the bridge must have been known.

Fuses. The frequent occurrence of fires already alluded to is a strong testimony in favour of the fuses used in the shell. It is rather an interesting fact that very shortly after the Japanese were practically testing the fuses from their 4·7-inch quick-firing guns at the expense of the Chinese, an English cruiser, with exactly similar guns and fuses, was carrying out a similar test on an African village. In a report on the latter, special mention is made of the excellence of the fuses, and this is particularly satisfactory in view of the fact that at Alexandria, as will be recollected, the fuses were most inefficient. At Benin, as at Yalu, three-pounder shell with Hotchkiss base fuses were also fired, and so sensitive were they, that it was almost useless firing them through the bush which grew between the village and river, for it was found that if the shell encountered even the feeble resistance offered by a few leaves and twigs, it was sufficiently checked to put the fuse in action. This should have been expected, for these fuses are purposely arranged to go off when the shell grazes the water at a small angle. Such sensitiveness may be a drawback when it is necessary to bombard an African village, but might be of great value under other conditions of war. The graze fuse

possesses the important advantage of being easily tested by ships during peace time under Service conditions. The fuses used at Alexandria were not graze fuses, opportunities of testing them were most rare, and when they were required in actual warfare they failed.

High explosive shell.

High explosives, such as gun-cotton, melinite or lyddite, have not been used as bursters for shell during the war. We have therefore yet to learn what effect they will produce. The gunpowder bursters have greater tendency to set objects on fire, and attention has already been drawn to the damage done in this way. Serious as a fire in action must be, it is doubtful if it can be as demoralising as the detonation of a high-explosive shell. The thin sides of the cruisers engaged during the battle of Yalu would have given exactly the best conditions for an attack of these shell. It is well here to remark that although nearly all the leading European Powers are adopting high-explosive bursting charges, England still adheres to gunpowder. There is, however, a report that captains of French men-of-war are given the option of landing their melinite shell during peace time, and that most of them have availed themselves of this license. Should not a proportion of high-explosive (not necessarily melinite) shell be carried by all ships of the cruiser or battleship types ?

Cordite.

Cordite was used only on board the Yoshino, but there it fulfilled all expectations. Nor is this the first time that cordite has been used in actual warfare, for the insurgent vessels of the Brazilian Revolution were supplied with it, and fired a large number of rounds. The officers who were in the forts at Rio de Janeiro have given a description of their feelings when cordite was used *against them*. With their enemy at a moderate range, the first intimation they had that fire had been opened on them was the arrival of the projectile; and they declared that this caused much greater demoralising effect on the men than when smoke issuing from the enemy's gun gave the warning of a messenger of death.

This seems a favourable opportunity of vindicating the character of the Brazilian gunners for artillery practice. The bad shooting they made at the opening of the war is quite accounted for by the powder they used, which had been years and years in store in that hot climate, and had deteriorated to such an extent that it was always uncertain whether the shot would go more than half its distance. Even the gunners of the Royal Arthur or Blake could not have made good practice with such material. When the Brazilian insurgents, later on, acquired the Tamandare with a considerable amount of cordite, a very different degree of accuracy was observed in their fire, which, as just explained, taught the officers and

men in the forts respect for ships whose guns fired without smoke. Cordite therefore may be said to have passed through its *baptême de feu*, and, having given good results in Japan and Brazil, in cold weather and in hot, there can no longer be any risk in adopting it for service.

Disposal of empty cartridge cases.

What to do with the empty cartridge-cases from quick-firing guns has been a question often asked. The Japanese simply pitched them down the hatchways, and, in spite of this rough treatment, the cartridges were found almost all serviceable for reloading after the battle. It stands to reason that the 1200 or more cartridges fired by the Yoshino could not have been left to encumber the fighting deck, and the Japanese solution to the problem is probably the best. All the Japanese ships were fitted with special apparatus for supplying the ammunition from the magazine deck to the fighting deck; on board the Yoshino the 6-in. ammunition lifts were worked by steam, and the 4·7-in. by hand. With these there seems to have been no difficulty experienced in maintaining the supply to the guns, but the older pattern of elevator on board the other ships gave some trouble. The lifts with their separate tubes or shafts have the advantage of keeping the supply entirely separate from the return of the empties. It is highly important that all the men should be kept employed during an action: it would therefore probably be convenient to let the men who form the crews of the guns on the unengaged side remove the empty cartridges from the fighting decks whilst their own guns were silent. This would give them plenty of occupation.

Armoured protection.

The full advantages of armoured protection have not been prominently brought forward during the war under discussion. The only two ships which can properly be called armourclads (the Chen Yuen and Ting Yuen) are said to have stood the battering from the quick-firing guns admirably, and it is possible that their armour saved them from destruction or capture, but it hardly required a fleet action to discover that fourteen inches of compound armour would withstand shot from 6-in. and 4·7-in. guns at a range of at least 2000 yards. No case of armour being penetrated is reported, but the question is, did any of the projectiles from the large Japanese guns (32-c.m.) strike this armour? And if so, with what effect? It would have spoken well for the Japanese gunners if we had heard that the quick-firing guns knocked all the unprotected portions of the ironclads to pieces, and the 32-c.m. guns had perforated the armour; perhaps such discrimination is too much to expect from any gunners.

Shields.

While the Chinese enjoyed whatever advantage they obtained from the armour of the two ships above mentioned, the Japanese worked

most of their quick-firing guns under the protection of shields; whereas the Chinese had no such protection for their smaller guns. These shields are no doubt of most value at short ranges to give protection against bullets from rifles and machine guns, and, therefore, at Yalu their value could not have been so apparent. Thin shields at long ranges may indeed be a doubtful blessing, for they are likely to serve to burst without stopping the enemy's shell: and this happened more than once at Yalu. Besides which, some shields, not fitted with the elastic attachment lately introduced, dropped from their securing bolts on to the deck and prevented the mountings from training. The fact, however, of the shields suffering shows that they received blows, and perhaps in doing so gave the protection which they were designed to do.

Scouting. It seems a very remarkable thing that the battle of Yalu took place almost by accident. What were the fast cruisers of both fleets doing, that they did not give warning of the movements of their enemy? Had the Japanese known that the Chinese were at sea convoying a number of transports, they would surely have done better to attack them earlier, when they might have destroyed the transports, and so have prevented an addition being made to the Chinese land force. Moreover, the fighting part of the Chinese fleet would have had their movements much hampered by the transports. If nations aspire to the command of the seas, they must keep themselves acquainted with every move of their enemy. Each hostile fighting ship must be carefully watched by one of superior power, or if fleets have to be dealt with, by a cruiser of such speed that she can escape with the intelligence, should there be any move on the part of the fleet under her eye. How it came to pass that the Japanese with their fast cruisers, one of which had superior speed to any vessel in the world, neglected to keep a proper watch on their enemy, certainly requires further explanation. And while dwelling on this point it should be observed that the Japanese gave notice of their approach by the smoke their ships were making. They were probably burning native coal; but in war time such matters should have special attention. With nations more equally matched, ten minutes' more or less notice of the approach of a fleet might have serious consequences. There could be no excuse for a fleet of ours betraying their presence by their smoke, considering all the resources we have in the way of Welsh coal. The occurrence at Yalu will, it is hoped, strengthen the Admiralty in their determination not to allow any but Welsh coal to be used in the fleet, whether the nation be at war or at peace.

But if the manner of the meeting of the fleets causes surprise, the manner of their separation is yet more remarkable. One would have

thought that the Chinese ships in their crippled state would have fallen an easy prey to the Japanese, had they vigorously followed them up. It is probably just here that the moral effect of the Chinese torpedoes came into play. Admiral Ito's flag-lieutenant mentioned in his account of the battle that "the night was dark, the speed was only equal to that of our slowest damaged ship, and we were compelled to keep at some distance from their course on account of their torpedo flotilla, which might have attempted a night attack." This brings us to a consideration of the construction of the Japanese Fleet, and shows how imprudent it is for a fleet to go about without being perfect in its details. A few torpedo-catchers might have dealt with the torpedo-boats, and thus have rendered the Battle of Yalu a really complete victory to the Japanese. Most unfortunately, the only modern torpedo-catcher possessed by the Japanese had been stopped at Aden, and they were accordingly deprived of her services; it is unlike the Japanese to have omitted preparation for war in this respect.

Interchangeability of parts of guns and mountings

The Japanese, in purchasing their Q.-F. guns from Elswick, have the same advantages of interchangeability of all parts of guns or mountings as has our English Navy. The importance of this has been clearly demonstrated in connection with the battle of Yalu, for every gun which was not totally disabled was repaired and refitted with spare parts, some of which were taken from the totally disabled guns. Within three weeks of the battle all the ships returned to service and took their former positions in the fleet.

In conclusion, it must be admitted that so far it is impossible to distinguish a single point in the war which has really taught us anything fresh. New material has gone through the ordeal of actual warfare and has come out favourably, as was to be expected. As lookers on we can only repeat the old maxims: that it is absolutely necessary to arm ships with quick-firing guns; that every care must be taken to guard against the danger of fire; that too much importance cannot be given to the speed of ships and of fleets as a whole; that all fleets should be provided with torpedo-catchers, and if in quiet waters with torpedo-boats; that torpedoes are likely to be more terrible in moral effect than in actual execution; that invaluable opportunities for attack may be lost if an effective look-out on the enemy's movements is not maintained; and that, valuable as all the improvements in warlike material may be, there is nothing which will lead with as great certainty to success as discipline and training of men and officers.

CHAPTER VII.

International Law and the Sinking of the Kowshing.

The one important incident of the year in respect to international law of the sea arose in connection with the war between China and Japan. It serves to illustrate the grave difficulties and dangers that attend the virtual abandonment of formal declarations of war.

Sinking of the Kowshing.

During the month of July, the relations between China and Japan were so strained that an outbreak of hostilities was clearly imminent, and, indeed, from time to time rumours reached Europe that war had actually commenced. Active preparations were made by both Powers, and it was in the course of the preparations made by China that the now famous Kowshing incident occurred. The Kowshing was a steamer belonging to a British company, commanded by an Englishman, Captain Galsworthy, and manned partly by British subjects; and she was registered as a British ship. She was under charter to the Chinese Government, and on the 25th of July was engaged in the carriage of 1600 Chinese soldiers to Corea. According to the official account of the affair published on behalf of the Japanese Government, she was in the company of two Chinese vessels of war. When about 40 miles off Chemulpo, she was sighted by a Japanese vessel of war, the Naniwa, and a signal to heave-to was obeyed by the Kowshing. A Japanese officer came on board, examined the ship's papers, and ascertained the nature of the service in which she was engaged. The Naniwa then signalled the Kowshing to follow her, and at this point the trouble began. The English commander and his officers, probably supposing that war had broken out, were ready to act upon the Naniwa's orders, but found that they had their Chinese passengers to deal with. These absolutely refused to let the vessel proceed anywhere but upon her original course or back to China, and threatened to kill the ship's officers if they should attempt to carry out the Japanese orders. The captain informed the Japanese of his predicament, and received in reply an instruction to him and his compatriots to leave the ship. This, however, the Chinese were equally unwilling they should do. Finally, the Naniwa opened operations by firing a torpedo at the Kowshing, and, as the latter

was, save for the soldiers' small arms, an unarmed vessel, soon sank her. As to what followed there is some doubt. According to the first accounts received, the Japanese made no attempt to save life, and actually fired upon the men in the water; but later accounts showed that some, at any rate of the British subjects, were picked up and brought on board the Naniwa. Vice-Admiral Fremantle at once despatched H.M.S. Alacrity to the spot; she met the Naniwa at Nagasaki, and received from her the British subjects who had been held as prisoners.

Feeling aroused.

The incident caused at the time a strong feeling of indignation throughout the British dominions, not more, perhaps, because of the mistaken though common belief that the British flag on the high seas has the same immunity from interference as British territory, than because of the circumstances of inhumanity with which the whole attack appeared to be attended. When it appeared that the graver charges of barbarity were at any rate exaggerated, the storm abated, and it was felt that the matter might safely be left to the calm if somewhat dilatory course of ordinary diplomatic representation.

Questions at issue.

The real questions in the case are questions of fact. The Naniwa claimed to be exercising the right of visitation and search, a right exercised by a belligerent upon a neutral, and therefore postulating a state of war. If there is no war in existence, then, as has been decided over and over again, no war vessel can institute a search of the mercantile ships of another State. Moreover, as to the additional right of capture, it has been well said that "it is a well-supported and altogether reasonable view that either some clear notice should be given in order to throw upon third parties the duty of neutrality, or at any rate that there should be proof that the existence of war *de facto* was so public and notorious as to be in fact known to the neutral" (per J. M. Gover, *Law Magazine and Review*, August 1894). To this rule we may probably add one qualification —that where at the time of the commencement of an undertaking involving important services to a State hostilities are imminent, and are known by the neutral to be imminent, between that State and another, then if hostilities do in fact break out during the course of the adventure, the neutral engaged upon the service will be equally liable as if he had had knowledge of the fact of war.

When did war break out?

Still, so far as the present case is concerned, we are brought back to the question, Had war in fact broken out on the 25th? The answer appears to be that it had not, and the first encounters on land appear to have been on July 27th and 28th. But it has been suggested that the acts of the Naniwa constitute the commencement of the war, and so validate her conduct to the Kowshing. According

to the account of the incident said to be sanctioned at the time by the Japanese Government, the Kowshing was in company with two armed convoys when the Naniwa and two other Japanese war vessels were encountered. The Chinese, after flying the white flag, treacherously commenced an attack, but were beaten off and pursued, ultimately escaping. It was then, after a general naval engagement, that the Kowshing was dealt with. If this account is true, there was, of course, a state of war before the attack on the Kowshing, and the Japanese would be justified at any rate in doing their best to capture and arrest the forces of their enemy, whatever might be the ultimate fate of the vessel whereon they were carried. No substantial corroboration of this story appears, however, to have been received, and the general assumption is that it does not correctly represent the facts of the case.

A breach of international law committed.

But even supposing that the affair was one in which the British and the Japanese vessels alone were engaged, it has been suggested that the affair may constitute an outbreak of hostilities, so as to give Japan the rights of a belligerent and to impose on Great Britain the duties of a neutral. Mr. T. E. Holland, the Chichele Professor of International Law in the University of Oxford, wrote a letter in *The Times* of August 7th, in which he put forward this contention, saying that whether or not acts of war had been done before, the acts of the Japanese commander in boarding the Kowshing and threatening her with violence in case of disobedience were acts of war. But acts of war against whom? Surely, one would say, against the country whose property the vessel is and whose flag she is flying. Vague and uncertain as is the evidence of hostilities, it has never yet been allowed that they may be commenced by the enforcement of belligerent rights against third parties. With great deference to the authority of Professor Holland, we think that the true view of the case is contained in Mr. T. J. Lawrence's letter to *The Times* on August 24th, in which he submits that, on the facts disclosed, a breach of international law has been committed for which formal amends should be made.

How should the Kowshing have been treated?

Another question that arises is as to the proper mode of treating a vessel in the predicament of the Kowshing. She was not armed as a vessel of war; she could, therefore, hardly have resisted capture; and in the ordinary course of things she was entitled to the benefits of the judicial procedure of a Prize Court. Nothing is more certain than that a belligerent captain cannot administer justice against neutrals upon the high seas, whether it consist in taking out of her obnoxious persons—which was the offence in the case of the Trent—or in blowing her out of the water. If the Kowshing, therefore, had offered

no resistance, she was entitled to be taken to port. Her conduct, however, seems to have deprived her of this right; she was taken out of the hands of her regular commanders and was in the hands of mutineers. When once resistance is offered, there is no law which defines the amount of force by which it is to be opposed; and though it might have been possible to capture her, as it would have been more humane to attempt to do so, the adoption of more severe measures cannot be treated as in itself an offence.

Little else remains to be said concerning the war. As soon as it was clear that hostilities were in progress, the British Government issued their declaration of neutrality; and the provisions of the Act of 1870 have been rigorously enforced.

The Declaration of Paris.

In the *Times* of August 24th—the same day that Mr. Lawrence's letter was published—Mr. Gibson Bowles, M.P., draws attention to one of the difficulties and anomalies arising out of the Declaration of Paris, 1856. The Declaration contained a statement of principle on four matters, of which two only were properly declaratory in the strict legal sense of the term. It had long been recognised that "Neutral goods, except contraband of war, were not liable to capture under enemy's flag," and that blockades must be effective. But it was a new rule which abolished privateering, and which settled so much conflict of policy in the final adoption of the principle, "Free ships, free goods." These two rules, then, could only bind those Powers which acceded to them; and this fact is definitely recognised in the Declaration itself—"The present Declaration is not and shall not be binding, except between those Powers which have acceded or shall accede to it." This would be clear enough if war affected the belligerents alone. But this is not so; and where one of the parties to a war is a signatory to the Declaration, and the other not, the complications that may occur are almost endless. Thus in the present war, Japan has acceded to the Declaration, China has not. Strictly, therefore, it would appear that, while Japan may commission privateers to operate against China, these privateers can exercise no rights which involve collision with neutrals, unless these neutrals are, like the United States, not signatories of the Declaration. China, on the other hand, may commission her privateers with plenary powers. So as to the other rules; Japan is bound to grant immunity to all Chinese goods upon the vessels of neutral signatory Powers, while China is of course not so bound in regard to Japanese goods. The questions do not appear to have assumed great practical importance during the present war, since operations do not seem to have been largely waged against commerce, and neither Power appears to have availed itself of the services of privateers. But the matter is one of

grave importance while a great naval and carrying Power like the United States still stands outside the Declaration.

Territorial waters.

The Institute of International Law at its meeting in Paris in March adopted a number of resolutions upon the subject of territorial waters, being moved thereto by the insufficiency of the present three-mile limit both for the protection of fisheries and for securing the immunity of neutral shores from belligerent operations. For purposes of criminal jurisdiction, fisheries, and the other ordinary rights of sovereignty, the Institute recommends the substitution of six marine miles from the coast as the limit of territorial waters, the line to follow the sinuosities of the shore, save in case of bays with an opening less than twelve miles wide, when the limit is to be reckoned from a straight line drawn from point to point. For the purpose of defining the waters exempt from belligerent operations a different rule is adopted. The Institute expresses the opinion that there is no reason to have one zone for the exercise of the ordinary sovereign rights of peace and for neutrality in time of war, and the six miles adopted for the first purpose appears insufficient for the latter. It is therefore provided that in case of war, a neutral State should have the right to declare a neutral zone beyond the six miles to the full extent of cannon shot from the shore. It is important to notice that the Institute recognises the right of pursuit :—" L'État riverain a le droit de continuer sur la haute mer la poursuite commencée dans la mer territoriale, d'arrêter et de juger la navire qui aurait commis une infraction dans les limites de ses eaux." Pursuit must end as soon as the vessel enters the ports of its own State or of a third Power. It is needless to say that the proceedings of the Institute do not make law ; still, the eminence of the persons engaged, and the increasing habit of reference to tribunals likely to be influenced by the deliberations of the body, render its resolutions something more than pious wishes. At present the Institute is attempting to bring about uniformity in the rules which in different countries determine the right of merchant vessels to bear the flag of that country.

W. HARRISON MOORE.

CHAPTER VIII.

Naval Reinforcements in War Time.—The Supply of Warship Material and Machinery.

Any investigation of the resources of this country for the production of vessels of war, if it is intended to be comprehensive, not to say exhaustive, should include a reference to the nature of the materials used in shipbuilding and their supply. Here, however, a very few words on this subject will suffice, for certain it is that in this respect England stands, for the present at all events, in as good a position as any of her possible rivals.

Materials for shipbuilding.

In the days of the old wooden ships the capability of the country to supply timber for the construction of the Fleet bore a highly important relation to the interests of the Navy. Many proposals and suggestions were made, from the time of Elizabeth onwards, for the additional cultivation of the oak-tree, so as, if possible, to render the country independent of foreigners for the supply of this material. Naval students will not need to be reminded that it was a habit of Collingwood to carry acorns in his pocket and drop them in the hedgerows, with a view to the production of oak-trees and the increase of ships of the line. Only fifty years ago, indeed, I find a writer in the *Nautical Magazine* declaring that "the man who plants 500 acres of land with 20,000 oak-trees, which in ninety or a hundred years will be available in the construction of the sail of the line, is a true patriot, whilst by such an act his posterity will reap an ample fortune." At the very time this was written iron was already in use for shipbuilding, and although it did not gain so rapidly on wood in the war as in the commercial navy, yet with the construction of armoured vessels iron hulls became general. Since 1873 no wooden fighting ships have been constructed for the British Fleet. In its turn iron has given way to steel, until we may say that, except for small vessels, iron shipbuilding is virtually extinct.

Recent developments.

What further developments in the use of other materials for ship construction the future may have in store—and aluminium, certain bronzes, and various alloys of nickel, and other metals with steel, have been experimented with—for the present we have only to do

with the last named. In our war vessels, the hull, machinery, and armaments are all constructed of steel, and it is only necessary here to point out that we have abundant supplies of the crude material and ample provision for its conversion into the article used in manufacture. When we come to deal with armour and armaments it may be interesting to examine more fully the sources from which the Admiralty obtain their supplies, but so far as the provision for machinery is concerned I shall only refer to the matter very briefly.

It is frequently stated that foreign countries are obliged to import the materials for the construction of their warships, and that we stand alone in being able to produce a first-class battleship without having recourse to other nations. This is scarcely an accurate picture, for France can, and does, produce all that she needs for the purpose. Germany still purchases some auxiliary machinery in our country, but this is probably because she thereby gets it at a cheaper rate. Russia, too, could be self-supporting if she wished. I believe a rule has been made and received the Imperial sanction, forbidding purchases of war material abroad; but, in spite of this prohibition, she continues to buy machinery, etc., in this country and elsewhere. In the United States everything used in the construction and equipment of their war vessels is of home manufacture.

England builds cheapest.

But although these, and possibly other, countries may be able to produce the necessary articles for ship construction, and, what is more important, can purchase, at all events in Germany, France, and Belgium, the raw material at prices compared with which ours are very high, yet we can build cheaper because faster than they can. There are, however, signs that this advantageous state of things may not be continuous. All the greater Naval powers are fostering their private manufacturers, if not actually subsidising them, and this can hardly be said to be the practice at home. Every firm that wishes to compete for Government work must provide itself with a special plant and staff, and every engine shop must contain an installation of most expensive machinery. And, as it is, at least in part, for the national benefit to be able to obtain the assistance of these private firms, so it would appear wise to encourage those which evince a willingness to employ their capital for the service of the State.

Our resources for ship-building.

The result of enquiries in connection with our supplementary resources for warship construction made and published last year showed that there were sound reasons for anticipating that the private yards could turn out warships on the following scale, even if all existing Admiralty requirements were complied with :—

Forty torpedo-boat destroyers (Speedy and Havock classes) in about eighteen months.

Eighty cruisers (Crescent and Cambrian classes) in about two years.

Twenty battleships (Centurion and Renown classes) in about three-and-a-half years.

To achieve this result it would be necessary that twelve named firms, already experienced in armoured shipbuilding or with suitable plant for the purpose, should undertake to construct from one to two battleships apiece ; the same firms, and twenty-four others, should engage to supply the cruisers ; while nearly all these firms and several more which do not possess the plant for heavy work should contract to deliver the smaller craft within the time mentioned. Moreover, it was pointed out that if in case of war the Admiralty was content to give a free hand to shipbuilders and engineers of known character and experience to produce vessels of certain classes in the shortest possible time, imposing on them no unnecessary restrictions, the time for delivery could be considerably reduced.

As an instance of what can be done in this respect I may mention that contracts have recently been entered into by leading Scotch and north country firms for the delivery to a foreign Government of twin screw vessels, 500 ft. long and of 12,500 horse-power, suitable to be used as cruisers and commerce destroyers, ready for sea in twelve months from the date of order.

Admiralty contracts.

In regard to the acceptance of Government work, however, hesitation has been expressed by many shipbuilders owing to the numerous alterations alleged to be required by the Admiralty in the arrangement of design and detail during the progress of work. These may be, and most probably are, necessary in peace time, but that they cause delay and entail friction is to be seen by the claims made by the Thames Ironworks and Shipbuilding Company of Blackwall, and Messrs. Earle's Shipbuilding Company of Hull, for losses sustained in the construction of first-class cruisers entrusted to them under the Naval Defence Act.

Discontent of contractors.

It is not surprising that differences should arise between the Admiralty and its contractors. Where work is complex, and its progress continually suggests further developments, we should rather be astonished if some friction did not result. That some contractors have lost money upon Government work accepted under the Naval Defence Act is well known ; but these have, perhaps, not been altogether unwilling to lose upon Admiralty work for gain in other directions.

It is worth while, however, to set forth what appear to be the chief causes of discontent among private firms of shipbuilders, engineers, and other manufacturers of warship material, in relation to the present system of Admiralty contracts. This I am enabled to do, so far as they have been revealed to me in correspondence with numerous contracting firms.

Causes of discontent

The main grievance felt is, I learn, that at least three inspectors, whose decision is said to be final, make suggestions during the progress of work, which have to be carried out at the expense of the contractor, there being in no case any court of appeal. There is, first, the inspector at the factory during construction; there is, secondly, the inspector at the yard where the vessel is being built; and, thirdly, there is an inspector at the dockyard at which the ship is delivered. The views of these inspectors sometimes differ, and are alleged to be now and again contradictory.

All improvements are of course made at some expense to the contractor, but after he has effected one of any kind, and that improvement has been accepted, it appears in all future open contracts, and he has to compete for the supply in the future against all comers. It is averred that some improvements made by a contractor have been refused by one inspector, and yet have actually been known to appear in the next specifications issued. The contractor's drawings, or copies of them, are stated to have been shown to other firms.

Makers of auxiliary machinery feel it a grievance that, in the case of trial trips, they have to attend every trial, and this although their particular machinery may have been passed and approved at the first to take place. Great delay, I am told, frequently occurs in opening up engines for internal inspection after a trial trip, the work-people having sometimes to wait for days for an inspector to come and approve or otherwise. Finally, it is stated that the refusal of the Admiralty to insert a workable arbitration clause in the Government contracts, prevents many eligible firms from tendering for naval business.

Being entirely unbiased on the subject, it appears to me that the matters thus stated to be in dispute should not be difficult of settlement, and that in any case there may be good cause for the attitude of the officials. The point of public import seems to be, that in an emergency such as would be caused by the imminence of hostilities, there must probably be a relaxation of some of the rules now in force, if the nation wishes to bring about an augmentation of its fleet in the shortest possible time.

As to the accuracy of the shipbuilding estimate given above, it has

not, so far as I am aware, been questioned or disputed, and it is therefore here used as a basis for further investigation. For the present the supply of armour and armaments and that further important factor the capacity of the shipyards, machine shops, and drawing rooms, measured by the number of trained hands available as a whole in the kingdom for the prosecution of the work, are not considered, this paper being devoted to a numeration of our resources for the supply of machinery, boilers, and auxiliary engines, with the material used in their manufacture, and further to an enquiry as to whether these could keep pace with the demand created by an order for the ships given in the above estimate.

Resources for machinery

In dealing with the supply of machinery a distinction may be made between that required for the ships to be built in the dockyards and that which is to be provided for contract-built vessels. In the case of the first named, although the greater part of the machinery is supplied from outside, it has been the practice in recent years for the Admiralty to manufacture for some ships the propelling machinery and boilers in the public establishments. The system undoubtedly has its advantages and the result of the experiment from a financial point of view has no doubt been carefully noted by the naval authorities. As regards the relative cost no statement can be made, because, as far as I am aware, the figures have never been published separately for the dockyard-supplied ships, and a comparison in any case would be necessarily hampered by questions of incidental charges. On this subject, however, I find the following statement in a useful little work issued by the proprietors of the *Glasgow Herald*, and entitled, "The Shipbuilding and Marine Work of the World for 1894":—

Dockyard-built ships.

"The practice of giving the machinery to dockyard works to construct has been found serviceable in keeping the engine-repairing establishments up to date, whilst the results given on trial have been satisfactory. It has recently been extended, but there is little prospect of the engine contractors being excluded from Government work, even for dockyard-built ships, for there can be no doubt that the machinery factories have not the facilities for undertaking extensive works. . . . Moreover by enlisting the services of the private manufacturer in the construction of machinery for dockyard-built ships, the Admiralty secures the use of the immense plant of the country, and the co-operation of private engineers of the widest experience and greatest skill. The results of inviting contractors to submit designs to meet stipulated conditions rather than giving them the designs from Whitehall have greatly added to the efficiency and progress in recent ships."

Machinery made in dockyards.

Altogether the machinery of twenty vessels has been constructed or is being constructed in the dockyards, as shown in the following tabulated statement:—

Dockyard.	Ship.	Class.	Maximum.
			I.H.P.
Devonport	Pheasant	1st Class Gunboat.	1200
	Partridge	" "	"
	Lapwing	" "	"
	Ringdove	" "	"
	Phœbe	3rd Class Cruiser	7500
	Astræa	2nd Class "	9000
	*Talbot	" "	9600
	*Phœnix	Sloop	1400
	*Algerine	"	"
Sheerness	Gossamer	Torpedo Gunboat	3500
	Gleaner	" "	"
	Hebe	" "	"
	*Torch	Sloop	1400
	*Alert	"	"
Portsmouth	Rupert (re-engined)	Coast Defence Ship	6000
	Fox	2nd Class Cruiser	9000
	*Eclipse	" "	9600
Chatham	Forte	" "	9000
	*Minerva	" "	9600
Malta	Melita	Sloop	1200

* These are now being constructed.

In my former paper on shipbuilding resources it was assumed that in time of war the public establishments would be sufficiently engaged in repairing work, making good defects, and completing new vessels, and that as a consequence construction, pure and simple, would not be undertaken. It is extremely likely that the same causes would operate to bring about a cessation of the manufacture of machinery in the dockyards, for which reason in now dealing with emergency work our resources in this respect need not be further taken into consideration.

Machinery supplied by contract.

As regards dockyard-built ships, the machinery for which is supplied by contract, it will be instructive to give particulars of a typical case, because thereby it can be shown how the money paid by the country and the work done is practically spread over a very wide area, although this may not appear on the face of the contract, and, indeed, is not so well known as it should be. Moreover, *mutatis mutandis*, an exactly similar state of things occurs in regard to the construction and equipment of contract-built ships; for, as it will be explained later on, it is not every contract shipbuilder that supplies his own vessel with machinery. None supply it all, and this is

particularly the case with that intended for auxiliary and not for propelling purposes.

Machinery for Renown.

The example selected is the Renown, building at Pembroke: first, because she is a ship now under construction, and therefore exemplifying the practice as it is, and, secondly, because the contract for her machinery has been placed with a firm which is pre-eminently noted as manufacturing upon its own premises more articles than perhaps any other engineering establishment in the kingdom. That is to say, that in other instances the work would probably be spread over a still wider area. The contract for the whole of the propelling and auxiliary machinery of the Renown was placed in the hands of Messrs. Maudslay, Sons & Field, and the following statement shows how this firm is more or less the medium through which the greater part of the contract money finds its way to the various manufactories engaged in the production of special items connected with this class of work :—

Firms supplying it.

The propelling machinery and boilers are manufactured by the contracting firm; the steering engines by Messrs. Caldwell & Co., Glasgow; the air-compressing machinery by the contractors; the electric-light dynamos by Messrs. Siemens Bros. & Co., Ltd., Erith; the electric-light engines by the contractors; the evaporators and distilling condensers by Messrs. Caird & Rayner, London; the capstan engines are supplied by the dockyard; the pumps are manufactured by the contractors; the hydraulic machinery by Sir William Armstrong, Mitchell & Co., Ltd., Elswick; the boat hoists by Messrs. Clarke, Chapman & Co., Gateshead; the coal hoists and ash hoists by the contractors; the indicators (Richards' Patent) by Messrs. Elliot Bros., Ltd., London; and the telegraphs, revolution indicators, and voice pipes by the contractors.

So much for the machinery. Now to turn to material :—

The crank shafts are manufactured by Sir Joseph Whitworth & Co., Ltd., Manchester; the intermediate and stern shafts by Messrs. W. Beardmore & Co., Glasgow; the piston rods by Mr. W. Somers, Halesowen; the connecting rods by Messrs. John Spencer & Sons, Ltd., Newcastle; the cross-heads by Messrs. T. Firth & Sons, Ltd., Sheffield; the cast-steel crank-bearing frames by Messrs. W. Jessop & Son, Sheffield; the cast-steel pistons by Messrs. T. Firth & Sons, Ltd., Sheffield; the cast-steel cylinder covers by Messrs. John Spencer & Sons, Ltd., Newcastle; the steel springs by Messrs. George Salter & Co., West Bromwich; the brass condenser tubes by Messrs. Grice, Grice & Sons, Ltd., West Bromwich; the copper steam pipes by the Broughton Copper Company, Ltd.; the boiler plates by Messrs. W. Beardmore & Co., Glasgow; the boiler furnaces by the Leeds Forge

Company, Ltd., Leeds; and the boiler tubes by Messrs. Howell & Co., Sheffield.

The following firms were also engaged in the production of material, etc., for this contract:—Messrs. John Bibby Sons & Co., Manchester, rolled brass plates; Messrs. Ridley & Co., Ltd. Newcastle-on-Tyne, small steel castings; Messrs. Steward & Clydesdale, Ltd., Glasgow, steel tubes; Messrs. J. Russel & Co., Walsall, steel tubes; Messrs. Dewrance & Co., London, water gauges, etc.; Messrs. P. R. Jackson & Co., Ltd., Manchester, and Messrs. Applegarth & Co., London, sundry articles; The Elliott Metal Co., Ltd., Birmingham, rolled brass tubes; Messrs. W. and J. Galloway & Sons, Manchester, steel steam pipes; Messrs. J. Stone & Co., Deptford, brass forgings; The Weardale Iron and Steel Co., Ltd., London, light steel platings; Messrs. Harper & Co., Willenhall, sundries. The boilers are put together and finished, and the screw propellers are also manufactured by the contractors.

It will be seen from this example that no less than thirty firms whose establishments are situated in fifteen towns, were engaged in supplying various portions of machinery and material under a contract made by Messrs. Maudslay, Sons, and Field, Ltd., for a single ship, and no account has been taken of those who supply the crude material, such as the coal, iron, etc., used in the production of the various articles. A similar list of firms, directly or indirectly employed by the Government for the supply of materials in the construction of the ship herself, would be still more lengthy. It is obvious that if we multiply this number by that of the ships in my hypothetical estimate, or even by that of the vessels built under the Naval Defence Act, we enormously increase the area affected by a large Government order for shipbuilding, and see how widespread would be the stimulation if the Admiralty demands were made on an emergency scale.

Contract-built ships.

In dealing with the subject of the machinery supply for contract-built ships, it may simplify matters if it is explained that it is the Admiralty practice to make one firm responsible for the contract for both hull and machinery, even when the second firm is recognised as the sub-contractor for the machinery. That is to say that the Admiralty retain their right to associate engineers and shipbuilders, but put upon the latter the onus of principal contractors and the responsibility for completion, etc. It is, moreover, frequently the case that the Admiralty name certain specified patterns or patented articles to be supplied, and certain firms to be dealt with, while other portions of the vessel's equipment, such as capstans, are either ordered by the shipbuilder and inspected by Admiralty engineers, or

are supplied from the dockyards. As a rule, however, contracts are given for ships to be made in most respects ready for sea, but not including the putting in place of the armament, which is done after the ship arrives at the dockyard. This rule might, of course, be modified in an emergency in the case of contractors who supply guns, etc. The armour is usually bought by the Admiralty and supplied to the contractor, and the armament is always distinct from the ship and engine contract. The reason for this is obvious, for the Admiralty can thus deal with the supply as a whole for dockyard and contract ships.

Contractors for machinery.

We now come to the resources for supplying machinery; and here it may be mentioned that approximately the relative time taken to provide this description of equipment may be thus stated. A battleship's machinery of all kinds can be made in half the time it requires to build the ship. The same rule applies to first-class cruisers. As you come down in the scale of cruisers to, say, 1000 tons displacement, the proportion of time varies, until in the case of the smaller 17-knot gunboats, the engines would require nearly as long to put together as the ship. When you come to torpedo-boat destroyers, the engines would require about half as much more time to build as the hull, so that this circumstance must be taken into account when calculating how speedily we can increase our torpedo flotilla.

Who are also shipbuilders.

The shipbuilders who are also machinery manufacturers form a large proportion in the following lists. Then there are the engineering firms who will undertake to supply the whole of the machinery, both propelling and auxiliary. Next come the makers of specialities who would deal with the shipbuilders and engineers in respect to contract ships, or directly with the Admiralty at other times. Finally, the principal firms who provide material used in the manufacture of the various articles referred to.

It is scarcely necessary to repeat what was said on a former occasion, that the sequence in which the various firms are mentioned must not be considered as an indication of their relative capabilities. There is no intention to institute comparisons.

Palmer.

In the category of shipbuilders who are also manufacturers of machinery we have the Palmer Shipbuilding and Iron Company, Ltd., at Jarrow-on-Tyne, a firm which last year turned out in the aggregate 35,141 tons of shipping, with engines of 16,600 I.H.P. I furnished last year a very interesting and complete statement of the capabilities of this establishment. Among the ships recently built and engined by this firm are the battleships Resolution and Revenge, of 13,000 I.H.P., and the cruisers Pique, 9258 I.H.P., Rainbow, 9741 I.H.P., and Retribution, 9,367 I.H.P.

Earle.

Messrs. Earle's Shipbuilding and Engineering Company, Ltd., at Hull, is one of the most extensive works of this character in the kingdom, and possesses exceptional facilities for turning out ships and their machinery. The capacity of the machinery shops is equal to the supply of 55,000 I.H.P. per annum. Their output last year was 12,580 tons of shipping, and engines of 24,875 I.H.P. Recent ships built by the firm for the Government are the cruisers Endymion 12,000 I.H.P., and St. George, 12,000 I.H.P. The machinery for the cruisers Andromache, Apollo, and Charybdis, of 9000 I.H.P. each, was also supplied from this establishment. The work in hand includes the torpedo-boat destroyers Salmon and Snapper, and a yacht for the Niger Coast Protectorate.

Laird.

Messrs. Laird of Birkenhead are among the oldest contractors for Government ships and their machinery in this country. They are now building the battleship Mars, 14,900 tons, 12,000 I.H.P., in one of their docks, and will float her with machinery on board and all armour fixed. The boiler factory is supplied with the most modern plant, and is adapted for the highest and largest class of high-pressure boilers. The capacity of their machinery manufactory is 25,000 I.H.P. per annum. This firm has built and engined for the Government seventy-six war vessels, and for foreign Governments fifty-two warships. In addition to the Mars they have in hand three torpedo-boat destroyers and several ships for foreigners.

Barrow.

The Naval Construction and Armaments Company, Ltd., of Barrow-in-Furness, are large machinery suppliers as well as ship-builders. They have facilities for manufacturing propelling machinery up to 50,000 or 60,000 I.H.P. per annum, and make boilers of all kinds. The output last year was 20,656 tons of shipping, with engines of 29,550 I.H.P. Work now in hand includes the first-class cruiser Powerful, two second-class cruisers, the Doris and Juno, and three torpedo-boat destroyers, the Sturgeon, Star-fish, and Skate. They are also supplying the engines for the battleship Majestic, and have in addition supplied the machinery to twenty-three British warships, most of which they also built.

Belfast firms.

The firms of Messrs. Harland and Wolff, Ltd., and Messrs. Workman, Clark & Co., both of Belfast, are large constructors of machinery, and their plant is second to none in the country. The first-named firm turned out 65,448 tons of shipping, with engines of 41,800 I.H.P., last year, the highest total in the record. Messrs. Workman, Clark & Co. doubled their output of 1893, launching 32,453 tons, with 19,080 I.H.P. As I have already pointed out, both these firms are competent to undertake Government work, and in an emergency would certainly be willing to do so.

We now come to the Clyde, where the well-known shipbuilding and engineering firm of Messrs. Robert Napier & Sons, of Govan, have capabilities for constructing fifteen sets of engines simultaneously, and this is the highest number they have recently had on hand. These comprised four sets of engines and boilers for the British Government, of 18,780 I.H.P., eight sets for the Russian Government, of 18,600 I.H.P., and three sets for the Merchant Navy, making a total of 40,800 I.H.P. This firm has built and fitted machinery in sixteen vessels for the British Government, and in twenty-eight vessels for foreign governments, including Turkish, Russian, French, Danish, Dutch, and Spanish warships. The last ship finished for the Admiralty was the Gibraltar, 12,000 I.H.P. Napier.

Messrs. James and George Thomson, Ltd., of Clydebank, who are now among the most experienced warship builders, have at the present time on hand in their yards the battleship Jupiter, 12,000 H.P., the first-class cruiser Terrible, 14,500 tons, 25,000 I.H.P., and three torpedo-boat destroyers. They provide, in addition, all their own propelling machinery. Last year they topped the list of Clyde marine engineers with an output of 30,300 I.H.P. I have already stated the capacity of this establishment for shipbuilding, and whatever they can do in this respect they could keep pace with in the matter of engines and boilers. This firm has built and engined warships for Spain and Japan as well as for the British Admiralty, and one of their vessels, the Chiyoda, has played a useful part in the war between China and Japan, including the battle of the Yalu. Another is the ill-fated Spanish cruiser Reina Regente. Thomson.

The Fairfield Shipbuilding and Engineering Co., Ltd., made the machinery for the Edgar, 12,550 I.H.P., the Hawke 12,521 I.H.P., and the Hazard, 3714 I.H.P. They are now building two cruisers, the Diana and Venus, each of 9600 I.H.P., and three torpedo-boat destroyers. The output of machinery, which slightly exceeded that of the Clydebank firm in 1893, was only second to it last year with 30,100 I.H.P. Fairfield.

The London and Glasgow Engineering and Iron Shipbuilding Co., Ltd., built and engined the three second-class cruisers Indefatigable, Intrepid, and Iphigenia, which attained in their trials 9049, 9489, and 9337 I.H.P. respectively. They are now building and providing with propelling machinery the cruisers Dido and Isis. The capacity of their shops is up to 16,000 I.H.P., or say four sets per annum of medium power. London and Glasgow.

Messrs. Alexander Stephen & Sons, shipbuilders and engineers, Linthouse, Govan, the constructors of numerous vessels of every size and style for the commercial marine, manufacture the engines and Stephen.

boilers for all the ships they build. Their works have a large capacity, and their output in 1894 was upwards of 14,000 I.H.P., all for merchant steamers.

Hawthorn. Messrs. R. & W. Hawthorn, Leslie & Co., Ltd., engineers and shipbuilders, Newcastle-on-Tyne, in addition to building ships of war, are certainly among the largest Admiralty contractors for engines, etc. The annual machinery output of this firm has, for several years past, been close upon 50,000 I.H.P., which includes merchant as well as warship work, so we might safely expect them to accomplish up to 60,000 horse-power of Admiralty work only. There are, in addition, locomotive works, well fitted with machinery suitable for the small sizes of engines, which, in the event of a national emergency, could be utilised to largely increase the production. The output of this firm in machinery last year was 48,650 I.H.P., the heaviest in the country, and during the last eight years they have supplied with machinery the following British cruisers: Forth, Magicienne, Marathon, Katoomba, Mildura, Wallaroo, Barham, Bellona, Pallas, Sybille, Æolus, Brilliant, Bonaventure, and Cambrian. They are now building the engines for the battleships Victorious and Petropaulosk (Russian), and for three torpedo-boat destroyers. Messrs. Hawthorn, Leslie & Co. have also engined men-of-war for the Austrian, Brazilian, Chinese, Chilian, Danish, French, Italian, Japanese, Russian, Roumanian, and Spanish fleets.

The above are firms which in response to enquiries have expressed themselves capable of providing the propelling machinery for battleships or large cruisers. The shipbuilders about to be mentioned are also manufacturers of propelling machinery, as a rule only suitable for medium-sized cruisers, but there are some amongst them who could undertake heavier work, and certainly if their capacity for supplying the mercantile marine be taken into consideration, they should be able to do so.

Among the Scotch firms are Messrs. Caird & Co., Greenock, who built last year four sets of engines aggregating 19,800 I.H.P.; Messrs. Wm. Denny & Sons, Dumbarton, who have plant to build 50,000 I.H.P. per annum, and turned out in 1894 sixteen sets of 26,400 I.H.P.; Messrs. D. J. Dunlop & Co., Port Glasgow; Messrs. Gourlay Bros. & Co., Dundee; Messrs. D. & W. Henderson, Partick; Messrs. A. & I. Inglis, Glasgow, who have already supplied machinery to the Government; Messrs. Hanna, Donald, & Wilson, also Government contractors; Messrs. Lobintz & Co., Renfrew; Messrs. W. & B. Thomson & Co., Dundee.

In England among the shipbuilders, not already mentioned, who are also machinery makers, and could furnish the propelling engines

and boilers, either for large vessels or smaller craft, may be mentioned Messrs. Doxford & Sons, Ltd., of the Pallion Yard, Sunderland, and Messrs. Robert Stephenson & Co., Ltd., of Newcastle, both of whom have large engineering plant as well as shipbuilding capacity. Probably there are others, but these are all from which it has been possible to obtain particulars.

There are three English firms, whose work is world-renowned, that turn out vessels complete with machinery—these are the makers of torpedo craft—Messrs. Thornycroft, Yarrow, and J. S. White. Particulars of the recent vessels they have built will be found elsewhere in the *Annual*, and all three could increase the producing capacity of their works in case of need.

Contractors for machinery alone.

The principal machinery makers for ships of war, who are not also shipbuilders, are Messrs. Humphrys, Tennant & Co., Ltd., Messrs. Maudslay, Sons & Field, Ltd., and Messrs. John Penn & Sons, Ltd. All these well-known firms have for many years supplied the Admiralty and Admiralty contractors with propelling machinery and boilers for British men-of-war.

Humphrys, Tennant.

Messrs. Humphrys, Tennant & Co. have made a large proportion of the machinery for the fleet, and during the last few years have supplied thirteen sets of the largest sizes for battleships and cruisers, including those for the battleships Royal Sovereign, Empress of India, Hood, Repulse, and the Prince George (now building), and for the cruisers Blenheim and Grafton. They also do a great deal of work for Sir W. G. Armstrong, Mitchell & Co., for their fast cruisers, and, at the present time, have large orders in hand for the English, Russian, Japanese, and Argentine Governments. They can turn out from their workshops about 50,000 I.H.P. per annum.

Maudslay.

Messrs. Maudslay, Sons & Field, Ltd., are equally large manufacturers for the British Navy and foreign admiralties. They are the agents in this country for the well-known Belleville Water-tube Boilers, which are being fitted in the first-class cruisers Powerful and Terrible, and are to be supplied to nearly all the ships of this year's programme. They engined five vessels under the Naval Defence Act, and have now in hand the machinery for the battleships Renown and Cæsar, while they have recently re-engined the Monarch. The production of this firm is from 60,000 to 70,000 I.H.P. per annum, according to the class of engines required.

Penn.

The establishment of Messrs. John Penn & Sons, Ltd., at Greenwich, has been supplying machinery for British warships from the earliest days of the steam navy. A celebrated paddler was the Banshee, which exactly half a century maintained an average of 15·7 knots an hour on a three hours and a half run.

It is mentioned by Fleet Engineer Oldknow in Captain Eardley-Wilmot's "Development of Navies," that between the years 1852 and 1860 out of twenty-six sets of screw engines completed for the Admiralty twenty-one were supplied by the firms of Messrs. John Penn & Sons and Messrs. Maudslay & Field, and this is exclusive of a large fleet of high-pressure steam gunboats that were built and engined with unexampled rapidity at the beginning of the Russian war. The engines of our first ironclads, the Warrior and Black Prince, were supplied by Messrs. Penn & Son, and the same firm has just completed the engines for the Magnificent, and has in hand those for the Illustrious, in addition to other work for the Navy. The capacity of their works is about the same as that of the two above-mentioned firms.

There are also a number of engineering establishments, many of them on the Admiralty list, and at present largely engaged in work for the mercantile marine, to which in an emergency we might look for assistance if their services were needed in providing cruisers and small craft with engines and boilers. Among these may be mentioned Messrs. Ross & Duncan, Govan; Messrs. Muir & Houston, Kinning Park; Messrs. Bow, McLachlan & Co., Paisley; Messrs. Fleming & Ferguson, Paisley; Messrs. Belliss & Co., Birmingham; and the Wallsend Slipway and Engineering Co., Ltd.

Aggregate capacity of English firms.

The foregoing estimates refer entirely to the manufacture of propelling machinery and boilers, although at all these establishments pumps, winches, windlasses, and other materials are sometimes manufactured. We have here at least thirty firms with an aggregate productive capacity—to put it at a low figure—of not less than 750,000 I.H.P. If we place the I.H.P. of the 140 vessels of the hypothetical programme at the highest point, giving to the engines of each vessel a horse-power in advance by 20 per cent. of that with which our ships of similar classes are endowed, we cannot make the total more than 200,000 I.H.P., so that there need be no apprehension lest we should not be able to obtain the necessary machinery for propelling purposes. There might, indeed, be a difficulty about shafting and heavy forgings, but these matters I propose to consider separately, with the armour-plates and guns.

Auxiliary engines.

On turning to the makers of auxiliary engines and specialities I find that no less than thirty-two firms were employed in the supply of articles of this character to the sixty-four ships fitted under the Naval Defence Act. Thus the steering engines were supplied by eight firms, the air-compressing engines by four, the capstan engines by five, the coal-hoists by seven, and so on. The largest number of firms supplying one article was eleven, who provided ash-hoists,

and the smallest number three for evaporators and three for distillers.

At first sight it might appear from these circumstances that—at all events in regard to the supply of some specialities for a very large number of ships—there would be delay, but these articles can be manufactured much faster than the demand arises. Moreover, from the majority of the firms engaged in the work the information to hand shows that they have ample capacity for meeting with any probable call upon them.

Steering engines.

The makers of steering engines include:—

Messrs. Caldwell & Co., Ltd. (late Muir & Caldwell), Glasgow, who also supply boat-hoists and coal-hoists. This firm makes a speciality of steam-steering engines, and has fitted them in almost every class of vessel in the British Navy, from a battleship to a torpedo-boat destroyer. Besides being makers of steering gear for our own Government, they also make for the Governments of Austro-Hungary, Japan, Russia, and Spain. The weight of their steering gear supplied to the torpedo-boat destroyer Nimble is only 11 cwt. While retaining in all their engines one distinctive arrangement of controlling gear, their designs are capable of adaptation to almost every position in a steamship. Messrs. Davis & Co., Ltd., West India Docks, supply, in addition to steering gear, capstan engines and boat-hoists. Their special form of steering gear is fitted in many of the vessels of the Naval Defence Act and the more recent torpedo-boat destroyers. They also make for Russia, Spain, and other foreign Governments. Messrs. Bow, McLachlan & Co., Paisley, are general engineers, but are represented in the Navy by steering engines supplied to Clyde-built vessels. Messrs. Harfield & Co., Ltd., London, are makers of steering gear, capstan and anchor gear, and coal-hoists. The satisfactory results achieved with the new compensating steering gear supplied to the Sirius and Spartan, caused the Admiralty to enter into a contract with this firm as to patent rights for manufacture in the dockyards. The battleships Cæsar and Illustrious, and the cruisers Venus, Diana, Juno, and Doris, are being fitted with their steering-gear. Messrs. Amos & Smith, Hull, supplied steering gear to some of the Naval Defence Act ships, as did also Messrs. Napier & Sons and Messrs. Maudslay & Co.

Air-compressing engines.

Air-compressing engines are supplied by Messrs. Brotherhood & Co., Messrs. Belliss & Co., Birmingham, The General Engineering and Boiler Co., Hatcham Iron Works, New Cross, and by Messrs. Maudslay. Messrs. Belliss & Co., Ltd., are well-known engineers, who have built propelling engines for some of H.M. ships, and they supply in addition air-compressing engines, electric-lighting engines,

Electric light engines.

dynamos, coal and ash hoists, and fan engines. Other firms which supply electric light engines and dynamos are: Messrs. W. H. Allen & Co., Lambeth, who are also makers of all kinds of pumps and fan engines for the Navy; Messrs. Clarke, Chapman & Co., Gateshead-on-Tyne, who also make capstan engines and coal-hoists; Messrs. M. Paul & Co., Dumbarton, who also make fan engines and ash-hoists; Messrs. Scott & Mountain, Newcastle, electrical and general engineers and brassfounders; and the firms of Siemens Bros., Maudslay, Thornycroft, Willans & Robinson, Tangye, and King, Brown & Co.

Evaporators and distillers.

Evaporators and distillers are made by Messrs. E. & T. Weir, Glasgow, who are the sole manufacturers of their own patents. Upwards of fifty of the newer vessels of the Navy are fitted with their evaporator, and many more with pumps and distillers. They have work in hand now for the Powerful, Terrible, Magnificent, Majestic, Jupiter, Venus, Dido, and others, while numerous vessels in the French, Russian, Japanese and other navies are supplied by them.

Messrs. Caird & Rayner, London, have a similar business. In 1893 and 1894 they fitted up distilling apparatus on board about fifty first-class torpedo-boats, and in twenty-eight of the new torpedo-boat destroyers. In addition to many vessels already fitted they have work in hand for the Prince George, Renown, Juno, Doris, Dido, and Isis, of the British Navy; also sets for the two new Japanese battle-ships, the Czar's new yacht, the Standard, and other foreign vessels.

Messrs. John Kirkaldy & Co., Ltd., London, also manufacture evaporators, distillers, pumps, and feed-water heaters, making all parts and fittings of their machines themselves, with the exception of pressure gauges, which, by Admiralty instructions, are obtained from Messrs. Dewrance. Not only are the Kirkaldy distillers to be found in vessels of all the war and mercantile navies, but this firm has taken a leading part in the execution of large installations of distilling plant for our expeditionary forces during the Soudan, Ashantee, Zulu, and other campaigns.

A fourth and equally well-known firm manufacturing these articles is that of Messrs. Normandy.

Capstan engines.

Capstan engines are made among others by the already mentioned firms of Napier, Harfield, Caldwell & Co., Davis & Clarke, Chapman & Co.

Messrs. Baxters, Ltd., Sandiacre, Nottingham, make a speciality of capstan engines and windlass gear, but they also supply steering engines, electric light engines, and boat, coal and ash-hoists. This firm has recently supplied, or is now manufacturing, capstan engines and windlass gear for the Victorious, Talbot, Eclipse, Minerva, Juno,

Doris, and many other British war vessels. Their list of vessels supplied includes battleships or cruisers of the German, Spanish, Dutch, Russian, Brazilian, and Chinese Navies, with over one hundred and twenty torpedo-boats for the British and foreign Governments.

Nearly all the engineering firms make pumps, but in addition to the names already mentioned there are Messrs. T. & H. Gwynne & Co., London, and Messrs. Drysdale & Co., Glasgow.

Hydraulic machinery

Hydraulic machinery is procured from Sir William Armstrong, Mitchell & Co., Ltd., and Messrs. Brown, Bros. & Co. Ltd., Edinburgh. Propelling machinery for large vessels is not made at Elswick, but among the articles manufactured, in addition to hydraulic machinery, may be mentioned steering engines, electric light engines, air-compressing engines, dynamos, boat, coal, and ammunition hoists, and all torpedo fittings. The position of the firm of Sir William Armstrong, Mitchell & Co., Ltd., differs so considerably from the majority of those already mentioned, and the scope of its operations is so much more varied and extensive that it is not surprising to find the propelling machinery for the numerous vessels built at its yard obtained elsewhere.

Boat, coal and ash-hoists are made by most engineers, the only two firms not already mentioned who supplied these articles to ships of the Naval Defence Act being Messrs. J. H. Wilson & Co., Liverpool, and Messrs. Donkin & Co. (late Donkin & Nichol), Newcastle-on-Tyne. The last-named firm also makes steering engines, and has supplied auxiliary machinery of some sort to sixteen British men-of-war and several of the war vessels of the Austrian, Russian, Italian, Japanese and Chilian Fleets. Messrs. Alley & Maclellan, Glasgow, are general manufacturers of small sets of propelling machinery up to about 1000 I.H.P.; they also make steering engines, capstan engines, patent-feed water fittings, and all kinds of winches. They are now fitting auxiliary engines in the Terrible, Jupiter, Victorious, and other ships of the new programmes. Fan engines are manufactured by most of the marine engineering firms, and as to sets of boat engines, I have found it impossible to mention all the establishments in which these have been or are being manufactured for the Navy.

Furnaces appear to be almost invariably supplied either by the Leeds Forge Co., Ltd., Leeds, or by Messrs. John Brown & Co., Ltd., Sheffield. Boiler tubes are supplied by several firms, and in regard to all other material it may be said generally that the supply is practically unlimited.

Conclusions.

In the *Naval Annual* last year, I endeavoured to demonstrate and prove that, in its private shipbuilding yards, this country is possessed

of unequalled resources for increasing its fleet, and, furthermore, that this being the case, the circumstance should have an important bearing on our naval policy. For it seems obvious, that if it is intended to rely, with any hope of success, upon being able to utilise their services, in time of war, the various firms must be stimulated in time of peace, by giving them opportunities for gaining the necessary experience in this particular class of manufacture and special work. And, secondly, it must be made as certain as possible that when war threatens we shall have the time at our disposal to utilise their efforts to the utmost. It is evident, from these further enquiries, that the machinery makers, like the shipbuilders, are both ready and competent. As regards, then, the fulfilment of the first of the above-mentioned conditions, it is expedient that the Admiralty authorities should so arrange their system of dealing with contractors for naval material as to make sure of having at their back a number of selected firms, with well-equipped shops and a competent staff of trained men, to whom, in an emergency, they may turn for assistance, with every confidence of obtaining that which is required. Furthermore, an organisation of these firms is desirable, that there may be no delay owing to one particular article, be it armour, crank-shafting, or some other, being unobtainable in sufficient quantities.

To know that we can build warships faster and in greater numbers than any other country may be a great blessing, but if we put faith in it without assuring the time needed for the full development of these advantages, it will prove a curse. It is essential that at the beginning of a war our fleet should be adequate for the full performance of its duties, or, in other words, that our superiority in battle force afloat is already beyond dispute. If we are in this position, and only then, will it be in our power to rapidly augment the numbers of our small craft, such as torpedo-vessels, scouts, and commerce protectors, while we may be certain also, that should the war be prolonged, we can make good our losses in heavier craft at a rate with which no other nation can compete.

CHAPTER IX.

Manning.

No subject with which the head of the Naval Department has to deal is more important than the manning of the Navy. As we add ships to the fleet, so we must of necessity increase the number of men available for sea. And it is not an easy task to provide for our growing requirements within reasonable limits of expenditure. In dealing with this important question, it should be laid down as a fundamental principle that for the emergency of war we should depend on a Naval Reserve made efficient for the service by adequate training.

It is not necessary for the purpose I have in view, nor would it be consistent with the facts, to speak in a despairing tone of our position. It is satisfactory to know that the fleets, unprecedented in tonnage and power, engaged in the manœuvres of last year could be manned with crews aggregating no less than 20,853 men, besides upwards of 500 men from the Naval Reserve, leaving still available in the reserves in the ports 733 seamen and more than 500 engine-room ratings, and without drawing upon the permanent crews of the harbour ships, or the staff of the gunnery and training establishments. The crews of the training squadron, the Royal yachts, the coastguard cruisers, and store ships remained intact, and half the coastguard were as usual on shore. When, however, we turn from the manœuvres to the exigencies of a great struggle, possibly with a combination of powers, we must be prepared to man every effective ship on the list, including ships built and building. It cannot be far wrong to estimate their total complements at nearly 100,000 men. In a matter of such importance it is as well to give the details on which this estimate is based. It cannot pretend to exact accuracy, and even if it were accurate for the moment, it would not be accurate a year hence. The complements allotted to different ships are constantly varying. They vary with changes in the armament and according to the service in which they are

employed. A vessel in commission as a flagship naturally carries more officers and men than a ship which is a mere unit in a fleet.

First-class battleships.

We have nineteen first-class battleships completed, viz:

	Complement.
8 Royal Sovereign class	5,350
6 Admiral "	3,050
2 Barfleur "	1,200
3 Nile, Trafalgar, and Sans Pareil	1,700
Total ships completed	11,300
Add 10 ships building	7,500
Total	18,800

The complement of the Majestic was stated at her launch to be 757 officers and men.

Second-class battleships.

We have twelve second-class battleships, the complements of which may be estimated at 6000 men. The complements of such ships as the Devastation and Thunderer, which have a small auxiliary armament, will be considerably less than the average, while the complements of the Alexandra, Superb, and others will be largely in excess of the average.

Third-class battleships.

The complements required for our twelve third-class battleships may be taken at the figure we have given for the ships of the second-class, or, approximately, 6000 men.

First-class cruisers.

The list of first-class cruisers, as given in the comparative tables, includes seventeen armoured cruisers (excluding the Warrior), viz.:

	Men.
5 old battleships	3,500
7 belted cruisers (Aurora class)	3,500
Imperieuse and Warspite	1,100
Nelson, Northampton, and Shannon	1,600
Total	9,700

and thirteen protected cruisers, viz.:

Blake and Blenheim	1,150
9 Edgar class	4,950
2 Powerful class (building)	1,700
Total	7,800

Second-class cruisers.

In the list of second-class protected cruisers are included:

4 Mersey class	1,300
4 Leander "	1,240
8 Astraea "	2,600
21 Apollo "	5,660
9 Talbot " (building)	4,000
Total	14,800

A few unprotected second-class cruisers still remain in the effective list, two of which are actually in commission. The Inconstant, Raleigh, Active, Volage, and Boadicea would require about 2400 men. It is open to question whether they would be fitted out in case of war.

Third-class cruisers.

Our third-class cruisers may be divided into three classes, viz.: 14 protected cruisers (including the Magicienne and her four sisters, the Pearl and her three sisters, and the five ships of the Australian squadron), which, taking their average complement at about 220, would require, say, 3100 men; nineteen look-out ships, which would require about 3300 men; twenty-two masted cruisers of old type and inferior speed. With the exception of the four vessels of the "Gem" type, which will probably at an early date be removed from the effective list, all these ships are partially protected. The eleven cruisers of the "C" class, of which some are in commission in foreign stations and some are being refitted, would require about 3100 men; the Gem class would require about 1000 men, and the seven smaller vessels of the Caroline class about 1200 men, or 5300 men in all.

Coast defence ships.

Fifteen coast defence ships are enumerated in the list of the Navy, ten of which are at home and five abroad. The Prince Albert, Scorpion, and Wivern can hardly be considered effective ships. Including these, the total complements to be provided for this class would amount to 3000 men.

It is unnecessary to discuss in detail the remaining classes of ships. We may proceed to summarise the requirements of the Navy in officers and men as follows:—

Summary.

		Men.
29 Battleships, 1st class		18,800
12 " 2nd "		6,000
12 " 3rd "		6,000
30 cruisers, 1st class		17,500
46 " 2nd "		17,600
46 " 3rd "		11,700
14 coast defence ships		3,000
28 sloops and gun-vessels		3,500
33 torpedo gunboats (including Plassy and Assaye)		3,000
18 1st class gunboats		1,400
42 3rd class gunboats (Staunch class)		1,500
Special vessels (Polyphemus, Vulcan, etc.)		800
42 torpedo-boat destroyers	say	1,900
(?) torpedo-boats	"	2,000
(?) merchant cruisers	"	3,000
Total		97,700

It is probable that a certain number of the vessels included in the above estimate of our manning requirements will be removed from the effective list before all the ships now building are completed. This is especially the case as to the second and third class unprotected cruisers, such as the Inconstant and Emerald, and the coast defence

ships, Scorpion, Wivern, and Prince Albert. On the other hand, it must be pointed out that a few vessels have been excluded, the names of which still appear in the effective list, and that no estimate whatever has been given for the crews of second-class gunboats employed in fishery protection, or for the crews of surveying vessels, yachts, tugs, &c. To man every effective ship will require, three years hence, not less than 95,000 men. To be certain of having this number available for sea service, it does not seem unreasonable to estimate that, allowing 5 per cent. for sickness and casualties, we must have 100,000 men on the lists.

Numbers proposed, 1895-6.

Ten years ago, when the present writer had the honour of moving the Navy Estimates in the House of Commons, the total force voted for manning the fleet, including marines and coastguard, was 59,000. The numbers proposed for the present year are 88,850, being an increase of 5450 over last year, and 30,000 over the numbers of ten years ago. The following are the details:—

Seamen, etc., for service in H.M. Fleet	61,945	
Marines	15,363	
Coastguard	4,200	
Available for sea service		81,508
Various services	2,742	
Boys under training	4,600	
Not available for sea service		7,342
Total Vote A		88,850

Behind the permanent force we have in the Royal Naval Reserve 25,000 men, and 4000 seamen and marine pensioners. It would not be safe to count on more than two-thirds of the Royal Naval Reserve. The pensioners would probably be absorbed by coastguard and harbour duties. Taking 18,000 as the number available from the Reserve, the total force available for manning the fleet is now about 100,000 men, without making deductions for sickness, &c. It is evident that we have no margin to meet the rapid wastage of war. In this regard we are far behind the French, who, with fewer ships to man, have a Reserve of at least 100,000 men, all of whom have served at least three years in the Navy. It cannot be putting the standard of strength for our Reserve too high to ask that it should be raised to 50,000, of whom a considerable proportion should be stokers, drilled at the guns and trained to the use of arms.

There is no question as to our ability to raise the number of our continuous service men to any standard which might be thought desirable. Our stationary training ships are always full, and the experiment of the Northampton as a sea-going training ship appears to be entirely successful. From the latter source it is expected that some 500 lads will be entered as ordinary seamen after six months' train-

ing. It is natural that naval officers should desire that the manning of the Navy should be completed as far as possible by a permanent force. To provide such a force, however, in numbers adequate to the demands of war would involve an enormous expenditure, not only in pay, provisions, and pensions, but even more in the maintenance in commission of a sufficient number of ships to give to the men the practice at sea which is essential. It has never yet been attempted in any Navy. The crews of all foreign ships of war contain a large proportion of men who are under training.

Turning to our own Reserve, it is unsatisfactory that under existing regulations the men, though paid on a liberal scale, cannot be required to serve in the fleet unless called out by royal proclamation. There is no reason to complain of the quality of the force. Their efficiency is a simple question of the number of drills insisted upon, and that again is only a question of expense. As to numbers, we have a large body of fishermen and men in the coasting trade eligible for the second-class reserve, and there is no lack of recruits. To maintain the first-class reserve at a strength of 12,000 men, under the strict conditions laid down as to age, nearly exhausts the resources of our mercantile marine. At the last annual meeting of the Chamber of Shipping, Mr. Williamson, of Liverpool, a well-known authority, submitted a statement, showing that of a total of 235,000 hands employed, not more than 55,000 are British seamen. This is little more than half the strength of the French Naval Reserve. If the present rules as to age were relaxed, a considerable addition might be made to the first-class Reserve. How far we can rely on the mercantile marine in the future I will not venture to speak too confidently. Mr. Williamson is of opinion that the Navy must depend exclusively on men trained in the service, and the Chamber of Shipping supports his views. The Naval Reserve.

During a stay of many weeks in Calcutta last year I had frequent opportunities of ascertaining the opinion of the large body of merchant officers assembled in the port as to the state of the mercantile marine. The opinion general was that the supply of prime British seamen is falling off. Good seamen are still to be found. The first-class liners are well manned ; but the crews placed on board foreign-going sailing ships are sometimes little better than an undisciplined rabble. And want of discipline and too slender complements may be the cause of fatal disaster. This state of things seems to call for a remedy. As to complements, we may look for valuable suggestions from the committee on the manning of the merchant marine, which is now completing its labours under the guidance of Sir Edward Reed. As to efficiency, when I asked my friends, the ship-masters at Calcutta, what was to be done to improve Seamen in mercantile marine.

the manning of the ships under their command, the hope was generally expressed that a reform might be brought about through the Naval Reserve. At present the Naval Reserve is recruited from the mercantile marine. The desire of the ship-masters was that the direction of the stream should be reversed, and that the mercantile marine should be recruited from a reserve, trained to seamanship and discipline by some years of service in the Navy.

Suggestions for building up Reserve

The causes for the diminished supply of good seamen are not far to seek. Compulsory apprenticeship has been abolished. Sailing ships have largely given place to steamers. Competition carried to excess has brought freights often to an unremunerative point. Shipowners are driven to every expedient which may produce economy. Good foreign seamen can be secured for wages which compare unfavourably with the earnings even of unskilled labour in England. The result is that in British sailing ships, especially those sailing out of ports abroad, a large proportion of the complement before the mast consists of foreigners. It is not the duty of the State to favour any particular industry by supplying it with skilled workmen, but we want more seamen as a reserve for the Navy. On this ground it may consistently be urged that the Navy should undertake the training of boys for a short service in the Navy, from which they should pass into the Reserve. I would suggest five years in the Navy and fifteen years in the Reserve.

Such a proposal is not new. It was strongly pressed by the last Commission on Manning, of which Lord Cardwell was the Chairman. The existing Naval Reserve was organised on the lines traced by Lord Cardwell and his colleagues. And I may say that all their recommendations have been adopted, except the establishment of training ships. A long interval has elapsed since the Commission reported, but a special training for our Naval Reserve men has been rendered more than ever necessary by the changed conditions of employment at sea. To do what is wanted, ships would not be necessary. The preliminary training could be given as at Greenwich school at selected Board schools at the great ports. It is not necessary to enter into practical details, or to be precise as to numbers. I seek for the acceptance in principle by the Admiralty of a plan which can be recommended on the authority of a most competent Commission, and for which many later authorities may be cited. I might refer particularly to a paper contributed by Sir Geoffrey Hornby (whose recent death is so generally deplored) in the *Naval Annual* for 1893, and to a scheme on the same lines well worked out by an anonymous writer in the *Pall Mall Gazette* of September 15th last.

It is not necessary to deal separately with stokers. I have already

said that the Reserve should contain a sufficient proportion of that valuable class. It is gratifying to note in Lord Spencer's statement that firemen, attracted by the new regulations issued in 1893, have presented themselves in such numbers that the entry of men has had to be restricted to the very pick of the mercantile marine.

It is extremely desirable to provide employment for men on leaving the Navy and joining the Reserve. The experience of the Army in relation to a similar difficulty has not been altogether happy. In the case of all steamers in receipt of mail subsidies, conditions should be imposed that a proportion of the complement should be seamen of the Reserve. This would not go very far; but many other outlets are possible. Selected sailing-ships might receive a small bounty for carrying Reserve crews. After ten years' service at sea men might be permitted to be employed on shore, subject to periodical requalification in gunnery.

Officers.

Turning to the supply of officers, it is admitted that the lieutenants' list is far below our requirements, and the deficiency must be measured not by tens but by hundreds. To make an efficient naval officer is the work of years. To raise the number of lieutenants in the Navy in peace to the standard equal to the demands of war would be a great mistake. They could not receive promotion. They could not be sufficiently exercised at sea. Our mercantile marine is the only available resource to meet the present deficiency, and, well used, it would give us an enormous advantage over other Powers, whose navies have not behind them that vast sea service which British maritime enterprise has created.

Requirements in Lieutenants.

In the following estimate of our requirements in lieutenants, which has been compiled from the complements as given in the Navy List, lieutenants and sub-lieutenants have been included together, and the staff-commanders' posts, which are gradually being filled by lieutenants, have been taken into account.

				Lieutenants.
29 first-class battleships, viz.:				
Royal Sovereigns . .	8 at 10	=	80	
Barfleurs . . .	2 at 9	=	18	
Admirals . . .	6 at 8	=	48	
Nile	2 at 9	=	18	
Sans Pareil . . .	..		8	
Majestics . . .	9 at say 12	=	108	
Renown	say		10	
				290
12 second-class battleships .	..			96*
12 third-class " .	..			84*
	Carried forward .			470

* As none of these ships are in full commission, no details can be given. These figures are pure estimates, but are probably not very wide of the mark.

			Lieutenants.
Cruisers, First Class, viz.:			
	Brought forward		. 470
Achilles, etc. . . .	5 at 10	= 50	
Aurora, etc. . . .	7 at 7	= 49	
Warspite	2 at 8	= 16	
Nelson	2 at 8	= 16	
Shannon	..	7	
Blake	2 at 8	= 16	
Edgar	9 at 7	= 63	
			217
Cruisers, Second Class, viz.:			
Astraea, Amphion and Mersey classes	16 at 6	= 96	
Apollo class . . .	21 at 5	= 105	
Mercury	2 at 7	= 14	
Unprotected old type . .	say	= 30	
			245
Cruisers Third Class, viz.:			
M class	5 at 4	= 20	
Pallas (4), Archer, Bannack	26 at 3	= 78	
C class	11 at 5	= 55	
Caroline class . . .	7 at 3	= 21	
Gem class . . .	4 at 4	= 16	
			190
Coast defence ships . .	12 at 4	=	48
			1170
Torpedo gunboats	33 at 3	=	99
Sloops	28 at 3	=	84
First-class gunboats	18 at 3	=	54
Third-class gunboats	42 at 1	=	42
Torpedo-boat destroyers . . .	60 at 2	=	120
Torpedo-boats	say		100
Merchant cruisers	say		80
Special service vessels, including Vulcan, Polyphemus, surveying ships, etc. . .	say		100
Flag lieutenants	say		20
Total required for sea service . . .			1869

To these must be added forty lieutenants who are at present employed on coastguard duties, and ten who are on other services ashore. The total requirements would thus be 1929 lieutenants.

Present resources—Active List.

At the commencement of the present year there were 851 lieutenants and 241 sub-lieutenants, or 1092 lieutenants in all, on the Active List, of whom 151 were under instruction at the Naval College at Greenwich, or on board the Excellent. The position cannot be considered satisfactory when we have to depend on outside resources for nearly one-half of our officers in a most important rank to man the fleet in case of war. We may, however, take comfort from the fact that the position has improved since last year, and that the Admiralty are fully alive to our deficiencies in the executive branch of the service. The number of sub-lieutenants has risen from 161 in 1892 and 185 in 1893 to 241. The number of cadets in the Britannia has been raised from 240 to 270.

Naval Reserve

In the Naval Reserve there are 305 lieutenants, 374 sub-lieutenants, and 372 midshipmen; 104 eligible candidates were refused in September last, and 102 applications for entry have since been received from officers of the mercantile marine. The number of officers who have made themselves efficient by varying periods of service in the fleet is 283, against 248 at the end of last year. The mercantile marine, it is clear from these figures, is becoming year by year more valuable as a reserve for the executive branch of the Navy. It is the only available resource to meet a present deficiency, and well used it would give us an enormous advantage over other Powers, where the Navy has not behind it that vast sea service which British maritime enterprise has created.

Improvements in organisation.

Several improvements in the present organisation are desirable. The selection of young officers for first entry is made too much at haphazard. The Admiralty should be assisted in the sifting of applications by a committee of shipowners, presided over by a naval officer from the Reserves office, whose duty it should be to see every candidate personally and to report as to his probable fitness. The co-operation of such a committee is urgently needed, not only in the selection of officers, but in the negotiation of the terms and conditions of their service, in advising as to rates of pay and allowances, in framing regulations, and, generally, in making naval service popular with the merchant officers, and in keeping the two great branches of our marine in touch with one another. Every midshipman should be considered a probationer until he has completed twelve months in the Navy, and been reported efficient in his duties. This service should be compulsory and adequately remunerated. Efficiency should be further tested, and instruction should be extended by occasional service during the manœuvres, and by periodical short courses in gunnery. Officers of the Naval Reserve should be retired with honorary promotion as soon as they have become too old for duty in the rank to which they belong. The older officers on the lieutenants and sub-lieutenants' list of the Reserve are not suitable for employment in these ranks in H.M. Navy, and being in command of ships in the mercantile marine, they could ill be spared by the companies which they are serving.

In connection with the supply of officers from the merchant service for the Royal Naval Reserve, I may perhaps refer to the results of an experiment which I have been working for some years in two large sailing ships in the Australian trade. For merchant officers of a superior class an excellent preliminary education is provided in the school-ships "Conway" on the Mersey, and "Worcester" on the Thames. But no organised system was in existence for carrying

forward their education after the boys went to sea. I have attempted to supply this great want. Since the commencement, 113 boys have been entered in my ships, and 51 are now afloat. Of these 113 boys, a small proportion have disappeared after the first voyage, the majority of these because their friends were not equal to the expense, a few on the advice of the managers as not suitable for the sea. One or two were dismissed because their conduct was unsatisfactory. A further sifting took place at the end of the second voyage. The first batch of those who have completed their time have recently been up for the Board of Trade examination. All have passed with credit. The majority have gone to the chief Mail Lines, especially the P. & O., and some to the Indian Marine. Several have joined the Royal Naval Reserve as midshipmen. All would have joined if there had been vacancies. It may be added that the boys whose nautical education has been briefly sketched are the sons of officers in the services and professional men. Socially they are well fitted for admission into the Navy.

As a preliminary training for reserve officers of the Navy, I can conceive no course better than that through which these young gentlemen are put. They begin with two years of good scholastic instruction. They have four years at sea in a first-class sailing ship, in which the education is carried forward under a competent instructor, retired from the Navy. They then go up for their Board of Trade examination, and they enter their profession as young officers in a first-class steam service. With a small expenditure the Admiralty could, I am confident, extend the plan of training which I have sketched sufficiently to provide in large numbers the officers required in the Reserve. With help from the Admiralty, the amount of which need not exceed £20 a head annually, the system which I have been trying experimentally would, doubtless, be largely extended.

Engineers

The supply of engineers is one of the difficulties of the times. A strong reserve of competent practical men could certainly be raised in the mercantile marine, and officers could be drawn from the Reserve for temporary service in peace. It may not be unnecessary to urge that the Treasury should not fetter the action of the Admiralty by refusing its sanction to the terms which it is necessary to give in order to secure the services of an efficient body of officers in a most important line.

In closing this review of our requirements for the manning of the Navy, it may be appropriately said once more that we have nothing to offer in the nature of criticism of the steps which have been taken to reinforce the Navy; but we cannot believe that it is sound to go forward through the next ten years on the lines which have been

followed in the last ten years. To add 30,000 more men to the permanent force of the Navy would, I believe, be a misapplication of the public money. If we train our Reserve better: if we train our Reserve as the French train theirs—that is, by passing every seaman through the fleet, as we are now passing the officers—we shall then have a Reserve more fully trained than at present. Having these men at hand, the growth of expenditure on a continuous service force might be checked. The money so saved would be available for cruisers, works, and coaling stations. It is not the least of the arguments in support of a policy of strengthening the Reserve that it affords the means of accomplishing an improvement much to be desired in the recruitment, the discipline, and the efficiency of our noble merchant service.

CHAPTER X.

Shipbuilding Policy.

In the present chapter it is not necessary to review in detail the work which is going forward in naval construction for peace and war, at home and abroad, in a period of extraordinary activity.

Value of protection.

Before offering a few general suggestions as to the shipbuilding policy of the future, we may first ask what are the lessons which naval construction may draw from the war between Japan and China. Once more the value of protection by armour has been conclusively established. Indeed, so destructive is the effect of the new explosives and quick-firing armament on unarmoured sides, that it may almost be laid down as an axiom that no guns should be mounted without adequate protection, except those carried to repel the attacks of torpedo boats. We may even go the length of saying that it is better to have fewer guns with protection than more guns without protection. In the great war it was always an advantage to carry more guns than the adversary. In those days nothing effective in the nature of protection was possible. The conditions are quite different to-day. Protection can be given, and without it the slaughter at the guns is terrible. If it be decided that all guns must be protected, it follows that for any given number of guns carried afloat a larger tonnage must be built. It will require seven first-class cruisers to carry the same armament in armoured casemates which five ships could carry if the guns were mounted without such protection.

Dimensions.

On the question of dimensions it is not necessary to remind readers of the *Naval Annual* that, from the period of the controversy which arose in connection with the Inflexible, the policy has been advocated of building for the line of battle ships of medium dimensions in proportionately increased numbers, rather than ships of extreme dimensions in proportionately reduced numbers. Even when the liberality, the patriotism, and the spirit of Parliament

provides sums never before reached in votes for building, armaments, and repairs, there is a limit to the number of ships which can be laid down. The desired numerical advantage is never gained. Equality with any two Powers is aimed at. But equality with any two Powers means that a considerable advantage, in the proportion of five to three, must be secured to the Power having to take the offensive, which will be compelled to hold the seas, while the fleets acting on the defensive are secure in harbour waiting their opportunity.

In view of these considerations it is not superfluous to press the argument for moderate dimensions, even at a time when the resolve of this country is fixed, that at any cost the Navy must be made strong enough to keep the Empire secure. There is a special reason why this question should be discussed at the present time. We are now engaged in completing a programme of shipbuilding for the line of battle. Attention, it is obvious, must shortly be given very anxiously at the Admiralty to the types which shall be adopted for the next group of ships to be laid down. It is when this question, so momentous for the Navy, is under consideration, that discussion out of doors may be of advantage in securing that every aspect of the problem may be duly weighed by those responsible for taking a decision.

Foreign construction.

In dealing with the requirements of the British Navy we can never put out of view the construction in progress for foreign navies. We have ten ships building for Great Britain of an average tonnage of 14,600 ; in France eleven ships are in construction with an average tonnage of 10,500 ; seven ships are building in Russia with an average tonnage of 10,300. In addition to these vessels two coast-defence ships of 6485 tons are completing in France, and three of 4120 tons are building in Russia. The newest French and Russian battleships are under 11,000 tons; the newest German and Italian ships are under 10,000 tons. The new types laid down for Italy mark a conspicuous contrast to the ships of the extreme dimensions formerly in favour, which were the first specimens of their class in any Navy. There are only five ships building for foreign countries which exceed the limit of 12,000 tons. The list includes the Italian Sicilia, 13,300 tons, the Russian Three Saints, 12,480 tons, the French Bouvet, 12,010 tons, and two battle ships of 12,450 tons now building in this country for Japan. Our own vessels now building exceed by over 4000 tons the average tonnage of the ships building for foreign countries.

Let us see what are the advantages obtained from the larger tonnage of our ships by comparing the Majestic with the ships most

New battleships compared.

recently laid down in France and Russia. In armament, as the following table shows, we find no marked superiority:—

—	GREAT BRITAIN. Majestic (9).	FRANCE. St. Louis (3).	RUSSIA. Poltava (3).
Displacement	14,900 tons	10,800	10,960
Speed	17·5	18	17·5
Coal capacity	(Normal) 900 (Maximum) 1850	680	900
Armament	4 12-in. 12 6-in. Q.F. 16 12-pr. (3-in.) Q.F. 14 small Q.F.	4 12-in. 10 5·5-in. Q.F. 6 3·9-in. Q.F. 36 small Q.F.	4 12-in. 8 8-in. 24 small Q.F. ..
Armour—			
Belt	9 in. + 4 in.	16 in.–10 in.	16 in.
Barbette	14 in.	16 in.	10 in.
Upper works	..	$3\frac{1}{4}$ in.	..
Casemates	6 in.	..	$4\frac{3}{4}$ in.
Cost	£975,754	£960,000	£1,098,000

In the matter of speed and offensive power our ships possess no advantage over the ships recently laid down in France and Russia, but they must be pronounced to be far better protected, although the maximum thickness of armour may not be as great. French designers have always adhered to a continuous belt at the water-line, which in the case of the St. Louis and two sister ships has a maximum thickness of 16 in. amidships tapering to $9\frac{3}{4}$ in. below the water-line. The new Russian ships are also protected by a complete belt at the water-line. The protection adopted in the Majestic class has been fully described in the first chapter of the present volume. A very large area of the side (a depth of 16 ft.) is protected by 9-in. Harveyed steel. The protection afforded by the side armour is re-inforced in the region of the water-line by the 4-in. armoured deck being sloped down to the lower edge of the belt. To reach the vitals of the ship a projectile would have to possess sufficient energy to penetrate 15 in. of Harveyed steel. In the Majestic the side is protected up to the level of the main deck, in which a portion of the auxiliary armament is mounted. The main armament in each case is mounted in pairs, but the bases of the turrets in the English ships are better protected than in the French ships. Our ships have a conspicuous advantage in carrying all their auxiliary armament mounted in casemates. In the French ships the auxiliary armament is carried in a battery protected by 3-in. armour. Below the battery

the side is completely unprotected. We may accept with confidence the distribution in the British ships of the weight available for armour, as finally settled after the careful consideration which we are assured has been given to the subject by the naval and professional advisers of the Admiralty.

Our larger dimensions give us advantages in coal supply and storage of ammunition of the highest importance to a fleet at sea at a distance from its base. Looking to the ships now building for our Navy, let us accept them without cavil or criticism, as necessary for a fleet having duties to perform such as a British Navy might be called upon to undertake. Viewed as examples of professional skill in design and construction, our latest ships must command the highest admiration. All must admit that Sir William White has given a full equivalent in added fighting efficiency, for the addition of 1000 tons to dimensions, which has been allowed on the Majestics, as compared with their predecessors of the Royal Sovereign type. The guns are carried 4 ft. higher, with an equal addition to the freeboard. The protection for the guns, as it has already been said, is greatly improved. The launching of the Majestic, with a displacement of 7300 tons, in less than a year from the date of laying down, is a feat unsurpassed in any yard, public or private.

Advantages of large dimensions.

I fully recognise the superiority of the latest battleships in many elements of fighting efficiency. But when a new programme of building is understood to be in preparation, I feel bound to repeat the arguments which I endeavoured to put clearly and concisely in a letter published last year in the *Times* newspaper :—

"There are certain considerations which must be kept in view in connection with naval construction. One of the most obvious is this, that we must accept as inevitable that no ship of war can be completely satisfactory. With increasing dimensions the skilful naval architect will show a more than proportionate gain in sea-keeping qualities, speed, coals, endurance, armour, and armament. But, when all has been done that increase of tonnage renders practicable, the head of the officer in command remains and must remain as undefended in the heaviest ship as in the slenderest of torpedo-boats. With the most perfect discipline and the coolest courage, a ship in rapid movement in close action must be paralysed for an interval, which, however brief, may prove fatal, by the death of the captain.

Letter to the *Times*.

"A like observation applies to the hull below the water-line. It remains in the largest as in the smallest ship completely unprotected

by armour from any blow which may be dealt by the ram or the torpedo.

"In the latest designs it has been sought to strengthen the means of offensive defence by large additions to the minor armament. These additions may greatly improve the chances, so long as the light is sufficient to enable the approach of an enemy to be detected. The offensive defence by quick-firing guns will be of no avail in dark nights, rain, snow, and fog, contingencies sure to be often experienced by fleets engaged in the arduous task of sealing up an enemy in any of the ports of Europe. In such circumstances a large flotilla of sea-keeping torpedo-boat destroyers is the only resource. Of this essential type we cannot build too many.

"In the consideration of this question of dimensions, the personal element demands attention. However large the liberality of Parliament, however strong the patriotic impulse of the country, ships which cost more than £1,000,000 must be comparatively few. The fewer the ships of which our fleets are composed, the fewer are the opportunities for dashing and enterprising officers, whose qualities for command must necessarily remain undiscovered until brought to the test of actual warfare.

"If, again, we look to the battles of the past for guidance in the tactics of the future, we see that Rodney, Nelson, and the other great commanders of their brilliant age gained their victories not only by their valour, but by their skill in concentrating an overwhelming force of British ships upon a portion of the enemy's fleet. In fleets propelled by steam, concentration of forces at the point selected for attack must remain the primary aim, and it will be more easily accomplished by the commander having superior numbers at his disposal.

"In designing ships hydrographical considerations cannot be put aside. It is well to build a full proportion of vessels available for all services that may be required from the Navy, which are not excluded by their draught of water from many of the busiest harbours of the world, which can approach coasts likely to be the scene of naval operations, and which are able to pass through the Suez Canal. The Russo-Turkish war and the Egyptian campaign were the last occasions when important services were demanded of the Navy. In the most threatening phase of the Russo-Turkish war the Fleet, under the command of Sir Geoffrey Hornby, remained for many months in the Sea of Marmora. In such narrow waters it can hardly be contended that ships of 15,000 tons can be handled to the best advantage or exhibit proportionate superiority over antagonists of smaller size.

"The Egyptian campaign still more strikingly illustrates the disadvantage of excessive dimensions. The new first-class battleships could not enter the port of Alexandria. It might be of extreme importance to send strong landing parties ashore. Such an operation would be easy from the harbour, perhaps altogether impracticable from the offing. In the later movements of the Fleet, when it became necessary to occupy the Suez Canal, the new battleships could have taken no effective part; they cannot pass through the Canal."

The inability to pass through the Suez Canal, by reason of excessive draught of water, is the more serious in view of recent events in the far East. We have seen the development of Japan as a naval power of no mean importance. It is impossible to foretell the course of history. Certain it is that we have an enormous stake in the trade and commerce of the East, and that our interests will be respected and the maintenance of peaceful relations will be assured in exact proportion as it is known that we are in the position of the strong man armed. Russia and France have recently made large additions to their fleets in this part of the world. It is therefore obviously desirable that the ships next to be laid down should be available, in case of need, to pass through the Suez Canal.

The Renown.

So far as I am able to judge, we have in the Renown, now building at Pembroke, an admirable example of a battleship of medium dimensions. Within the limit of 12,350 tons, Sir William White has succeeded in providing for an armament of four 29-ton guns, ten 6-inch, and twenty-two smaller quick-firers. The speed is 17 knots with natural, and 18 knots with forced draught. The coal supply is 800 tons. The estimated cost of the ship, including guns, is £729,522, as against £987,577 for the Magnificent. As nine of the ten ships now building are of the largest dimensions yet reached in naval architecture for war, our next batch of ten ships might well be of the type represented so admirably by the Renown.

Cruisers.

Having argued for medium battleships, I have no objection to offer to the two cruisers of the unprecedented dimensions of 14,200 tons recently laid down. We must have an answer in the British Navy to every forward movement in construction which we witness elsewhere. For general service we should probably prefer repetitions, with improvements, of the admirable type of first-class cruiser which Sir William White has produced in the Crescent, and the not less meritorious type of second-class cruiser which we have in the Eclipse class. Both these types have high speed, adequate armaments, and coal endurance at 10 knots speed, officially stated to be equal to

10,000 knots. All our modern cruisers have the high speed at the measured mile of 19 to 20 knots.

Destroyers.

Torpedo-boat destroyers are obviously indispensable for our Fleet, and in very large numbers. Great progress has recently been made in this type by our own firms of Thornycroft, Yarrow, and Laird; by Normand in France, and the Schichau establishment in Germany.

Naval Expenditure.

The general position having thus been briefly stated, the question naturally arises: Are the efforts we are now making for the reinforcement of the Navy adequate to our needs? A comparison of expenditure is probably the best measure of relative progress in construction. It may at least be assumed that we receive as full value for money spent on wages and materials for shipbuilding as can be obtained by the administration of any other naval power. In round figures the sum proposed for new construction in 1895 is £3,000,000 for France and £2,000,000 for Russia. Our total for 1895–96 is £5,393,642. The estimate for 1894–95 was £4,500,000, or an increase of £900,000. In the last ten years the expenditure on the construction of new vessels in France and England compares as follows:—

Year.	England.	France.
1884–85	£2,242,070	£1,510,704
1885–86	3,737,000	1,355,684
1886–87	3,495,000	1,280,000
1887–88	2,819,537	2,510,020
1888–89	2,398,805	1,848,930
1889–90	3,440,311	1,759,684
1890–91	5,426,346	2,396,000
1891–92	5,680,119	2,800,000
1892–93	4,286,908	2,800,000
1893–94	3,179,928	2,918,120
1894–95	4,500,000	3,049,720

Taking expenditure as the guide, it would seem that we should be able to hold our own.

The expenditure on the Navy has been feebly opposed in the recent debates on the estimates. The House of Commons has been moved to make a liberal appropriation upon grounds which were clearly and effectively stated by Sir Charles Dilke. The safety of our commerce on the ocean is of vital importance. We know instinctively and intuitively that our existence as a nation depends on our ability to hold our own at sea. In a sense it is lamentable to see so much money drawn from the taxpayers for purposes of defence in times which are not too prosperous; but the surest way to put an end to

an international rivalry in expenditure is to take a determined line—to do what Lord Northbrook did when he was at the Admiralty: to lay down at least two battleships for the British Navy for every similar ship laid down by those Powers whose navies we must be prepared in case of need to meet. To act, then, is to check the growth of expenditure on fleets, and to maintain the peace of Europe.

In framing a programme of shipbuilding for the future the policy of the British Admiralty should be that recommended to the United States in the last report of the Secretary to the Navy. In 1894 Mr. Herbert repeats the views set forth in his Report for 1893. Unarmoured cruisers are not, he observes, properly speaking, fighting vessels. They can destroy merchant ships, they can fight vessels of their own class, but they cannot meet armoured vessels with any reasonable hope of success. The military value of a commerce-destroying fleet is easily over-rated. Referring to the twenty years' war, from 1792 to 1812, Mr. Herbert says, with truth, that the two great factors in determining the issue in favour of England were her numerous battleships, with their hardy crews of Anglo-Saxons, and the enormous wealth of the greatest sea Power in the world. The captures of merchantmen were an irritant and a provocative to more determined efforts. They did not produce any real distress or weaken our fighting power. That fighting power was concentrated in our battleships, and these, kept together in fleets instead of being scattered in convoys, won for us the decisive battles of the Nile, St. Vincent, and Trafalgar. Mr. Herbert refers to the history of the American Civil War, and to the useless depredations of the Alabama, in further support of his argument that if the Government is in future to have naval strength enough to command peace and be in a position to enforce the terms dictated by a sense of right and justice, it must have more battleships and must build a reasonable number of torpedo-boats. For the defence of ports torpedo-boats are perhaps more effective, according to cost, than any other class of vessel.

Secretary of U.S. Navy.

Looking to general considerations, and to the comparative strength of the British and other navies in the several classes, I am unable to conceive of any advice more suitable to our own requirements than that quoted from Secretary Herbert. We must have cruisers sufficient to deal with the similar vessels which may be opposed to us, but beyond this it is not well that expenditure on cruisers should be carried. For all purposes of communication, and for watching the operations and the movements of hostile fleets, the fastest vessels of our mercantile marine will serve our purpose perfectly. We do not take them up for manœuvres because it would be most costly, and

inconvenient to trade. In war, considerations of this kind would have no weight.

Mercantile Marine.

Turning to the Mercantile Marine, it is evident that the length at which that subject can be noticed in the pages of the *Naval Annual* cannot be proportionate to its enormous importance to our country. As an old sea-farer, I lament the disappearance of sails, and I must own that I cling to the belief that for the longest voyages, and for cargoes in the delivery of which despatch is not urgent, sailing ships, like canals, may long continue to be utilised for the advantages offered in point of cheapness. I was able to quote at Southampton last year the results of some calculations by Professor Biles, which showed that working expenses in certain typical ships on long voyages were 25 per cent. less in sailing ships than in steamers. In the first cost the sailing ships were cheaper by 30 per cent. There is less rapid depreciation through the rapid progress of mechanical invention.

In working expenses, both in sailing ships and steamers, the advantages are conspicuous as displacement is increased. The Gothic, recently built by the owners of the White Star Line for the New York trade, and the Ceric, built for the Australian service, are able to carry enormous cargoes at a speed of 12 knots at a far lower cost than would be possible in smaller vessels. Messrs. Brocklebank have been building similar ships for their Calcutta trade. We are looking in the future for a considerable construction of steamships capable of carrying 8000 to 9000 tons dead weight. The only limit to their development lies in the difficulty of obtaining cargoes to fill holds of such enormous capacity.

We have not at this moment in construction in the United Kingdom any ocean greyhound exhibiting what may be characterised as sensational features. In the United States Messrs. Cramp have two ships in hand for the American line between New York and Southampton, which merit particular notice. The principal dimensions are—Length, 535 ft.; beam, 63 ft.; displacement, 16,000 tons; horse power, 20,000 tons; guaranteed speed, 20 knots.

The mention of these vessels suggests a few words in conclusion on the policy of subsidies for the ocean mail services. Foreign naval powers have found it necessary to incur a large expenditure for the purpose of fostering and encouraging maritime enterprise under their respective flags. They regard, and rightly so, their ocean mail services as indispensable auxiliaries to their war navies.

In a paper read before the Institution of Naval Architects in 1893, figures supplied by the kindness of Mr. Henniker Heaton, M.P. were

quoted, giving the subsidies for mail services conducted under the official flag of the leading maritime States :—

Name of State.	Amount paid.	Total Foreign Trade of the Country.
	£	£
France	1,043,513	300,000,000
Germany	1,000,000	313,000,000
Russia	251,000	111,000,000
Italy	400,000	182,000,000
Great Britain	637,000	740,000,000

Among the leading companies the P. and O. Company receives under postal contracts £340,000 ; the Messageries Maritimes, £554,000 ; the Compagnie Générale Transatlantique, £446,320 ; the North German Lloyd, £220,000 ; the Italian Navigazione Generale, £380,000 ; the Austrian Lloyds, £152,000.

The British taxpayer may be congratulated on the enterprise which has created our noble Mercantile Marine at so small a cost to the State. It is a question, however, whether we do not sometimes carry the spirit of economy to a point which can hardly be approved on the broadest considerations of patriotism.

Ottawa Conference.

The Conference at Ottawa last year attracted universal interest, and justly afforded satisfaction alike in the mother country and her daughter state. Evidence was even there displayed of the desire felt in every quarter of the British Empire to preserve its unity. The statesmen assembled at Ottawa were wisely resolved to limit their specific recommendations to matters rife for immediate action. The improvement of the great lines of communication between the several portions of the British Empire is obviously desirable. One important link is still to be created. As a first step the Conference pressed on the Imperial Government the policy of giving subsidies to a service between Vancouver and Australasia. The question is still in debate. I would express the hope that the decision may be favourable. Subsidised lines have a value not to be lightly esteemed as a relatively inexpensive means of giving the needful training and employment at sea to our Naval Reserves.

PART II.

BRITISH AND FOREIGN ARMOURED AND UNARMOURED SHIPS.

PART II.

ALPHABETICAL LIST OF BRITISH AND FOREIGN ARMOURED AND UNARMOURED SHIPS.

THE list of ships of the British Navy has been compiled from various sources. The official *Navy List* has been the principal guide, and the list is also in accordance with the Navy Estimates for 1895–96. The displacement and indicated horse-power have generally been given as stated in the *Navy List*. The figures under the head of coal endurance, giving the radius of action at ten knots speed, have been criticised. They have been computed from the quantity of fuel that can be carried in the bunkers, without making allowance for the consumption of auxiliary engines, and are based upon performances, or estimates of performances, under the most favourable conditions of weather and the ship's bottom. The figures, therefore, do not pretend to represent the actual coal endurance. It would have been possible to give fairly reliable figures obtained from an actual trial for certain ships, but, with the view of maintaining uniformity, the old arrangement has been adhered to.

The principal dimensions and other details of the foreign ships have been in most cases extracted from the Austrian *Marine-Almanach*, and from the *Aide Mémoire de l'Officier de Marine*, from the Navy Estimates submitted to the several national Parliaments, and from other public official documents.

There being now no uniform system of classifying the ships of all nations, an attempt has been made to assimilate as far as possible the classification of foreign fleets to that adopted in the British *Navy List*. Occasionally this has been only approximately practicable. It will be observed that the distinction between the smaller gun-*vessels* and the sea-going gun-*boats* is not always apparent, and the former term, applied by some nations to craft to which we apply the latter, has, for special reasons, been preserved.

The designation of foreign guns as a general rule by *centimètres* of calibre will permit easy reference to the Tables of Ordnance of the several Powers in Part III. of this volume.

In general, it may be stated that, as every nation is engaged in either replacing its naval ordnance with new and improved pieces, or in rearranging the armament of individual ships, it is only

possible to republish the latest accessible information on the subject. The quick-firing machine gun and torpedo armaments of every fleet vary continually.

To prevent confusion the vessels commonly known as Torpedo Catchers are named in these lists First Class or Torpedo Gunboats. In the British Official *Navy Lists* they are called First Class Gunboats, and in French Lists are known as Aviso Torpilleurs.

Torpedo-boats of all classes below Torpedo Gunboats are placed in a separate list.

Troop and Storeships, Armed Tugs, Special Service Vessels, Training Ships, and Harbour Service Ships are not included in these lists.

The ships of those Powers whose navies are of small importance will be found at the end of Part II.

The sketches of the ships are all drawn on the same scale (except in a few cases specially indicated), so that their relative sizes are apparent by inspection.

ABBREVIATIONS.

The following abbreviations are used throughout the Alphabetical List, occurring mainly in the first column, showing the class of ship, and in the armour column:—

a.c.	Armoured cruiser.	cr.	Cruiser.
a.g.b.	Armoured gunboat.	d.v.	Despatch vessel.
b.	Barbette ship.	g.b.	Gunboat.
br.	Broadside ship.	g.v.	Gun-vessel.
c.b.	Central-battery ship.	H.S.	Harveyed steel (in armour column).
c.d.s.	Coast-defence ship.		
comp.	Composite-built hull.	2 s.	Twin screw.
comp. (in armour column).	Compound or steel-faced armour.	t.	Turret-ship.
		Tor. boat des.	Torpedo-boat destroyer.
c.t.	Conning-tower.	to.cr.	Torpedo-cruiser.
cop. shd.	Copper-sheathed.	to.g.b.	Torpedo-gunboat.
corv.	Corvette.	to.r.	Torpedo-ram.

P.	Deck protected throughout.	The thickness of the deck protection in inches is given under the letters P or pp.
pp.	Partial deck protected.	

Armament abbreviations. As breech-loading rifled guns are now the most numerous in all fleets, it must be understood that all guns are of that description, unless it be otherwise indicated.

l.	Light guns under 15 cwt., including boats' guns.
M.L.R.	Muzzle-loading rifled guns.
M.	Machine guns.
Q.F.	Quick or rapid-firing guns.
f. tu. or b. tu.	Fixed or bow tube for discharging Fish Torpedoes.
sub.	Submerged tube for do.
l. car.	Launching carriage for Fish Torpedoes.

GREAT BRITAIN.—Armoured Ships.

Class.	NAME.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Completion.	Cost. Hull.	Cost. Machinery.	Armour. Side.	Armour. Bulk-head.	Armour. Turret. or Barbette	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dischargers.	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
		tons.		ft. in.	ft. in.	ft. in.				£	£	in.	in.	in.	in.			knots.	tons.	knots.
a.c. 1st cl.	**Achilles** (iron)	9820	4000	380 0	58 3½	27 3	Chatham	Penn	1864	375,429	69,117	4½	4½	..	18 to 10	14 12-ton M.L.R., 2 6-in. 5-ton, 8 3-pdr. Q.F., 16 M., 2 l.	..	12·7	750	2500
t. 2nd c.	**Agamemnon** 2 *s.* (iron)	8660	4500	280 0	66 0	24 0	Chatham	Penn	1883	402,295	101,770	18 & 15	16½ & 13½	16 & 14	18 to 9 3″	4 38-ton M.L.R., 2 6-in., 6 6-pdr. Q.F., 8 3-pdr. do., 5 M., 2 l.	2 l. car.	12·1	960	4100
a.c 1st cl.	**Agincourt** (iron)	10,600	4000	400 0	59 5	27 9	Birkenh'd	Maudslay	1868	381,700	83,777	5½	4½	..	10	17 12-ton M.L.R., 10 3-pr. Q.F., 7 M., 5 l.	2 l. car.	12·0	750	1300
t. 2nd c.	**Ajax** (iron) 2 *s.*	8660	4500	280 0	66 0	24 0	Pembroke	Penn	1883	411,622	106,735	18 & 15	16	16	18 to 9 2″	4 38-ton M.L.R., 2 6-in. 6 6-pdr. Q.F., 8 3-pdr. do., 5 M., 2 l.	2 l. car.	12·1	960	4100
c.b. 2nd c.	**Alexandra** . 2 *s.* (iron)	9490	7000	325 0	63 8	26 6	Chatham	Humphrys	1877	394,263	120,061	12 to 6	8 to 5	..	12 & 10 1½″–1″	8 18-ton M.L.R., 4 22 ton, 6 4-in., 4 6-pdr. Q.F., 6 3-pdr. do., 13 M., 3 l.	4 l. car.	14·3	680	2700
b.[t] 1st cl.	**Anson** (steel) 2 *s.*	10,600	F. D. 11,500	330 0	68 6	27 3	Pembroke	Humphrys	1889	*x* and *y* 724,765		18 *comp.*	16 *comp.*	14 to 12 *comp.*	10 to 15 3″–2½″	4 67-ton, 6 6-in., 12 6-pr. Q.F., 10 3-pr. do., 7 M., 2 l.	1 f. tu., 4 l. car.	16·9	1200	7100
c.b. 3rd c.	**Audacious** . 2 *s.* (iron and zinc sheathed)	6010	3300	280 0	54 0	23 8	Glasgow	Ravenhill	1869	193,863	52,619	8 to 6	5	..	10	10 12-ton M.L.R., 8 4-in., 4 6-pdr. Q.F., 6 3-pr. do., 6 M., 3 l.	4 l. car.	11·6	500	1260
a.c. 1st cl.	**Aurora** (steel) 2 *s.*	5600	8500	300 0	56 0	22 6	Pembroke	J. & G. Thomson	1889	*x* 220,550	*y* 64,000	10 *comp.*	16 *comp.*	12 conning tower.	6 3″–2″	2 22-ton, 10 6-in., 6 6-pdr. Q.F., 10 3-pr. do., 6 M., 3 l.	2 l. car.	18·1	900	8000

a.c. 1st cl.	**Australia** (steel)	2 *s.*	5600	8500	300	0	56	0	22	6	Glasgow	Napier	1888	195,390	63,000	10 *comp.*	16 *comp.*	12 conning tower.	6 3″–2″	2	22-ton, 10 6-in., 6 6-pdr. Q.F., 10 3-pr. do., 6 M., 3 l.	4 l. car.	18·1	900	8000
b. 1st cl.	**Barfleur** (steel, cop. shd.)	2 *s.*	10,500	13,163	360	0	70	0	25	6	Chatham	Greenock Foundry	1894	Total. 599,089		12 *comp.* 4 nickel steel above	.. 12 *comp.*	9	.. 2½″–2″	4	29-ton, 10 4·7-in. Q.F., 8 6-pdr., 12 3-pr. do., 7 M., 2 l.	7 f. tu. (2 sub.)	18·5 (17·54) by log.	1240	5180
c.d.s. *c.b.*	**Belleisle** (iron)	2 *s.*	4870	2600	245	0	52	0	21	0	Poplar	Maudslay	1878	240,000 (purchased)		12,10, 8,6	9,6,5	9 conning tower.	16 & 9 3″–1″	4	25-ton M.L.R., 6 6-pdr. Q.F., 9 M., 2 l.	2 l. car.	11·9	510	1824
c.b. 3rd c.	**Bellerophon** (iron)		7550	4000	300	0	56	1	26	7	Chatham	Penn	1866	235,738	86,963	6	5 8 pilot tower.	..	10		10 8-in., 4 6-in., 6 4-in., 4 6-pdr. Q.F., 12 M., 4 l.	2 l. car.	12·4	650	1610
b. 1st cl.	**Benbow** (steel)	2 *s.*	10,600	11,500	330	0	68	6	27	3	Blackwall	Maudslay	1888	*x* 650,820	*y* 110,000	18 *comp.*	16 *comp.*	14 & 12 *comp.*	12 to 15 3″–2½″	2	111-ton, 10 6-in., 8 6-pdr. Q.F., 10 3-pr. do., 7 M., 2 l.	1 f. tu. 4 l. car.	16·75	1200	7100
a.c. 1st cl.	**Black Prince** (iron)		9210	4000	380	2	58	4	26	10	Glasgow	Penn	1862	283,154	74,482	4½	4½	..	18 to 10	4	9-ton M.L.R., 22 6½-ton do., 2 6-in., 4 3-pdr. Q.F., 7 M., 8 l.	2 l. car.	12·7	750	1080
b. 1st cl.	**Cæsar**		14,900	12,000	390	0	75	0	27	6	Portsm'th	Maudslay	Bldg.	..		9 H. S.	14 to 9 H. S.	14 to 8 6-in. casemates, H. S.	.. 4″–2½″	4	12-in. wire, 12 6-in. Q.F., 16 12-pdr. do., 12 3 pdr. do., 8 M., 2 l.	5 f. tu. (4 sub.)	17·5	1850	6800
b. 1st cl.	**Camperdown** (steel)	2 *s.*	10,600	11,500	330	0	68	6	27	3	Portsm'th	Maudslay	1889	*x* and *y* 769,456		18 *comp.*	16 *comp.*	12 to 14 *comp.*	10 to 15 3″–2½″	4	67-ton, 6 6-in., 12 6-pdr. Q.F., 10 3-pr. do., 7 M., 2 l.	4 l. car.	16·9	1200	7100
b. 1st cl.	**Centurion** (steel, cop. shd.)	2 *s.*	10,500	13,214	360	0	70	0	25	6	Portsm'th	Greenock Foundry	1893	Total. 608,098		12 *comp.* 4 above	12 *comp.*	9 *comp.*	.. 2½″–2″	4	29-ton, 10 4·7-in. Q.F., 8 6-pdr., and 12 3-pr. do., 7 M., 2 l.	7 f. tu. (2 sub.)	18·51 by log.	1240	5180
b. 1st cl.	**Collingwood** (steel)	2 *s.*	9500	9500	325	0	68	0	26	10	Pembroke	Humphrys	1886	*x* 520,000	*y* 104,000	18 *comp.*	16 *comp.*	12 to 14 *comp.*	17 to 10 2½″	4	45-ton, 6 6-in., 12 6-pdr. Q.F., 8 3-pr. do., 6 M., 2 l.	4 l. car.	16·50	1200	8500

x Includes Hydraulic Machinery, Gun Mountings, &c.

y Propelling Machinery.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Completion.	Cost. Hull.	Cost. Machin'ry.	Armour. Side.	Armour. Bulk-head.	Armour. Turret. or Barbette	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dischargers.	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
		tons.		ft. in.	ft. in.	ft. in.				£	£	in.	in.	in.	in.			knots.	tons.	knots.
t. 2nd c.	Colossus (steel) 2 *s.*	9420	5500	325 0	68 0	26 3	Portsm'th	Maudslay .	1886	533,000	113,786	18 & 14 *comp.*	16 & 13 *comp.*	16 & 14 *comp.*	22 to 10 3"–2½"	4 45-ton, 5 6-in., 4 6-pdr. Q.F., 10 3-pdr. do., 6 M., 4 l.	2 l. car.	14·2	979	6260
t. 3rd c.	Conqueror. 2 *s.* (steel)	6200	6000	270 0	58 0	24 0	Chatham	Humphrys	1882	325,000	93,433	12 to 8½	11½ to 10½	12 turret & C.-T.	13½ to 9 2½–1¾"	2 45-ton, 4 6-in., 6 6-pdr. Q.F., 12 M., 2 l.	6 l. car.	15·3	650	5200
c.d.s. *t.*	Cyclops (iron) 2 *s.*	3560	1200	225 0	45 0	16 4	Blackwall	Elder .	1871	136,426	17,600	8 & 6	9 & 8 on breastwork.	9 & 10	9 & 11 1½"	4 18-ton M.L.R., 4 3-pdr. Q.F., 5 M., 1 l.	..	9.9	250	1920
t. 2nd c.	Devastation 2 *s.* (iron)	9330	7000	285 0	62 3	27 6	Portsm'th	Maudslay New Machinery	1873	290,660	63,188	12 & 10	12 & 10 breastwork. ..	14 & 12	18 to 16 3"–2"	4 29-ton, 6 6-pr. Q.F., 8 3-pr. do., 5 M., 2 l.	2 f. tu. (sub.)	14·0	1800	5980
t. 2nd c	Dreadnought 2 *s.* (iron)	10,820	6500	320 0	63 10	26 9	Pembroke	Humphrys	1875	485,573	107,000	14, 12, 11	13	14	18 to 15 3"–2"	4 38-ton M.L.R., 6 6-pdr. Q.F., 12 3-pr. do., 7 M., 2 l.	2 l. car.	13·7	1200	5250
t. 2nd c.	Edinburgh . 2 *s.* (steel)	9420	5500	325 0	68 0	26 3	Pembroke	Humphrys	1886	*x* 555,333	*y* 87,000	18 & 14 *comp.*	16 & 13 *comp.*	16 & 14 *comp.*	22 to 10 3"–2½"	4 45-ton, 5 6-in., 4 6-pdr. Q.F., 10 3-pr. do., 6 M., 2 l.	2 l. car.	14·2	970	6200
b. 1st cl.	Empress of India (steel) 2 *s.*	14,150	13,000 (*t*) 11,625	380 0	75 0	27 6 25 6	Pembroke	Humphrys	1893	Total. 838,087		18 *comp.* 5 above belt.	16 *comp.*	17 *comp*	.. 3"	4 67-ton, 10 6-in. Q.F., 16 6-pdr. do., 12 3-pdr. do., 8 M., 2 l.	7 f. tu. or l. car. (2 sub.)	17·5 18·0 by log.	900	5000
a.c. 1st cl.	Galatea (steel) 2 *s.*	5600	8500	300 0	56 0	22 6	Glasgow .	Napier	1889	*x* 195,390	*y* 63,000	10 *comp.*	16 *comp.*	12 *comp.* C. T.	6 3"–2"	2 22-ton, 10 6-in., 6 6-pdr. Q.F., 10 3-pr. do., 6 M., 3 l.	4 l. car.	18·1	900	8000
c.d.s. *t.*	Glatton (iron) 2 *s.*	4910	2000	245 0	54 0	19 5	Chatham	Laird .	1872	189,133	30,396	12 to 10	12 breast-work.	14 & 12	20 to 15 3"–1½"	2 25-ton M.L.R., 3 6-pdr. Q.F., 4 M., 1 l.	2 sub. f. tu.	11·0	540	2000

c.d.s. *t.*	**Gorgon** (iron)	2 *s.*	3560	1200	225	0	45	0	16	4	Jarrow	Ravenhill	1872	122,904	15,663	8 & 6	9 & 8 breast- work.	9 & 10	11 to 9 1½"	4	18-ton M.L.R., 4 3-pdr. Q.F., 5 M., 2 l.	..	9·9	270	1230
b. 1st cl.	**Hannibal** .	2 *s.*	14,900	12,000	390	0	75	0	27	6	Pembroke	Harland	Bldg.	..	..	9 H. S.	14 to 9 H. S.	14 to 8 6-in. case- mate. H. S.	.. 4"–2½"	4	12-in. wire, 12 6-in. Q.F., 16 12-pdr. do., 12 3-pdr. do., 8 M., 2 l.	5 f. tu. (4 sub.)	17·5	1850	6800
c.d.s. *t.*	**Hecate** (iron)	2 *s.*	3560	1200	225	0	45	0	16	4	Poplar	Ravenhill	1872	121,906	15,687	8 & 6	9 & 8 breast- work.	9 & 10	11 to 9 1½"	4	18-ton M.L.R., 4 3-pdr. Q.F., 4 M., 1 l.	..	9·9	270	1230
c.b. 3rd c.	**Hercules** (iron)		8680	8500	325	0	59	0½	26	6	Chatham	Penn .	1868	278,320	82,814	9 to 6	6 & 5	..	12 & 10	8	18-ton M.L.R., 2 12½-ton do., 4 6½-ton do., 6 4·7-in. Q.F., 9 6- pdr. do., 13 3- pr. do., 7 M., 2 l.	4 f. tu.	14·6	610	1760
t. r l c	**Hero** (steel)	2 *s.*	6200	6000	270	0	58	0	24	0	Chatham	Rennie .	1888	*x* 338,971	*y* 58,300	12 *comp.*	11½ *comp.*	12 *comp.*	13½ 2½–1¾"	2	45-ton, 4 6-in., 7 6-pdr. Q.F., 5 3-pr. do., 6 M., 2 l.	6 l. car.	15·2	620	5200
t. 1st cl.	**Hood** (steel)	2 *s.*	14,150	13,000 (*t*) 11,446	380	0	75	0	27	6	Chatham	Humphrys	1893	Total. 830,536		18 *comp.* 5 above the belt.	17 Re- doubt- *comp.*	18 *comp.*	.. 3"	4	67-ton, 10 6-in. Q.F., 10 6-pdr. do., 12 3-pdr. do., 8 M., 2 l.	7 f. tu. or l. car. (2 sub.)	17.5 17 by l. g	900	5000
c.d.s. *t.*	**Hotspur** (iron)	2 *s.*	4010	2500	235	0	50	0	21	10	Glasgow .	Napier .	1871	135,067	36,461	11 & 8	8 breast- work.	10 & 8½	15 to 10 2"–1"	2	25-ton M.L.R., 2 6-in. 5-ton, 4 6- pr. Q.F., 10 M., 2 l.	2 l. car.	11·25	300	920
b. 1st cl.	**Howe** (steel)	2 *s.*	10,300	11,500	325	0	68	0	27	3	Pembroke	Humphrys	1889	*x* 560,469	*y* 106,553	18 *comp.*	16 *comp.*	11½ to 10 *comp.*	15 to 12 3"–2½"	4	67-ton, 6 6-in. 5- ton, 12 6-pdr. Q.F., 10 3-pr. do., 7 M., 2 l.	1 f. tu. 4 l. car.	16·8	1200	7200
c.d.s. *t.*	**Hydra** (iron)	2 *s.*	3560	1200	225	0	45	0	16	4	Glasgow	Elder .	1872	121,451	16,918	8 & 6	9 & 8 on breastwork.	9 & 10	11 to 9 1½"	4	18-ton M.L.R., 4 3-pdr. Q.F., 5 M., 2 l.	..	9·9	250	1920
b. 1st cl.	**Illustrious**		14,900	12,000	390	0	75	0	27	6	Chatham	Penn .	Bldg	..	..	9 H. S.	14 to 9 H. S.	14 to 8 H. S. 6-inch c'sem't's	4"–2½"	4	12-in. wire, 12 6-in. Q.F., 16 12-pr. do., 12 3- pr. do., 8 M., 2 l.	..	17·5	1850	6800
a.c. 1st cl.	**Immortalité**. (steel)	2 *s.*	5600	8500	300	0	56	0	22	6	Chatham	Earle .	1889	*x* 221,500	*y* 57,000	10 *comp.*	16 *comp.*	12 C. T. *comp.*	6 3"–2"	2	22-ton, 10 6-in., 6 6-pdr. Q.F., 10 3-pr. do., 6 M., 2 l.	2 l. car.	18·1	900	8000

(*t*) On Trial. *x* Includes Hydraulic Machinery, Gun Mountings, &c. *y* Propelling Machinery.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Completion.	Cost. Hull.	Cost. Machinery.	Armour. Side.	Armour. Bulk-head.	Armour. Turret or Barbette	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dischargers.	Speed.	Coal Endurance. Coals that canbe carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
		tons.		ft. in.	ft. in.	ft. in.				£	£	in.	in.	in.	in.			knots.	tons.	knots.
a.c. 1st cl.	Impérieuse . 2 s. (steel, cop. shd.)	8400	10,000 (*t*) 7500	315 0	62 0	27 4	Portsm'th	Maudslay	1886	*x* 417,437	*y* 113,377	10 *comp.*	9 *comp.*	8 *comp.*	10 4″–2″	4 24-ton, 10 6-in. Q.F., 8 6-pdr. do., 10 3-pr. do., 6 M., 2 l.	2 f. tu. 4 l. car.	16·7 (*t*) 16·0	1130	7000
t. 2nd c.	Inflexible (iron) 2 s.	11,880	6500	320 0	75 0	26 4	Portsm'th	Elder	1881	648,811	146,457	24, 20, 16	22, 18, 14	17 & 16 *comp.*	17 to 25 3″	4 80-ton M.L.R., 8 4-in., 4 6-pr. Q.F., 2 3-pr. do., 15 M., 2 l.	2 f. tu. sub. 2 l. car.	12·8	1300	5200
c.b. 3rd c.	Invincible . 2 s. (iron)	6010	3300	280 0	54 0	23 2	Glasgow	Napier	1870	187,055	52,386	8 to 6	5	..	10	10 12-ton M.L.R., 6 4-in., 15 M., 4 l.	4 l. car.	12·5	500	1580
c.b. 3rd c.	Iron Duke . 2 s. (iron)	6010	3500	280 0	54 0	23 3	Pembroke	Ravenhill	1871	146,314	50,165	8 to 6	5	..	10	10 12-ton M.L.R., 4 5-in., 4 20-pdr., 14 M., 4 l.	4 l. car	12·4	700	3900
b 1st cl.	Jupiter . . 2 s.	14,900	12,000	390 0	75 0	27 6	Glasgow	..	Bldg.	..	..	9 H. S.	14 to 9 H. S.	14 to 8 H. S.	.. 4″–2½″	4 12-in. wire, 12 6-in. Q.F., 16 12-pr. do., 12 3-pr. do., 8 M., 2 l.	..	17·5	1850	..
b. 1st cl.	Magnificent . 2 s.	14,900	12,000	390 0	75 0	27 6	Chatham	Penn	1894	..	..	9 H. S.	14 to 9 H. S.	14 to 8 H. S. 6-inch casemts.	.. 4″–2½″	4 12-in., 12 6-in. Q.F., 16 12-pr. do., 12 3-pr. do., 8 M.	5 f. tu. (4 sub.)	17·5	1850	6800
b. 1st cl.	Majestic . 2 s.	14,900	12,000	390 0	75 0	27 6	Portsm'th	Barrow	Bldg.	..	..	9 H. S.	..	14 to 8 H. S. 6-inch casemts.	.. 4″–2½″	4 12-in., 12 6-in. Q.F., 16 12-pr. do., 12 3-pr. do., 8 M.	4 f. tu. (4 sub.)	17·5	1850	6800
b 1st cl.	Mars . . 2 s.	14,900	12,000	390 0	75 0	27 6	Birkenh'd	..	Bldg.	..	..	9 H. S.	14 to 9 H. S.	14 to 8 H. S. 6-in. casemts.	.. 4″–2½″	4 12-in. wire, 12 6-in. Q.F., 16 12-pr. do., 12 3-pr. do., 8 M., 2 l.	..	17·5	1850	6800
a.c. 1st cl.	Minotaur (iron)	10,690	4000	400 0	59 4¾	27 3	Blackwall	Penn	1867	377,325	79,505	5½	4½	..	10	17 12-ton M.L.R., 4 4·7-in. Q.F., 8 3-pr. do., 8 M., 3 l.	2 l. car.	12·0	750	1200
t. 3rd c.	Monarch (iron) (under repair.)	8320	(*t*) 8216	330 0	57 6	26 7	Chatham	Maudslay New Machinery	1869	279,903	74,672	7 to 6	5 to 4½	10 to 8	12	4 25-ton M.L.R., 2 12-ton do., 1 6½-ton do., 4 12-pr. Q.F., 10 3-pr. do., 6 M., 2 l.	2 f. tu.	14·5	630	1500

a.c. 1st cl.	**Narcissus** (steel)	2 *s.*	5600	8500	300	0	56	0	22	6	Hull	Earle	1889	*x* 195,890	*y* 61,500	10 *comp.*	16 *comp.*	12 conning tower. *comp.*	6 3″–2″	2	22-ton, 10 6-in. Q.F., 6 6-pdr. do., 10 3-pr. do., 6 M., 3 l.	4 l. car.	18·1	900	8000
a.c. 1st cl.	**Nelson** (iron) (Zinc sheathed.)	2 *s.*	7630	5500	280	0	60	0	26	6	Glasgow	Elder	1880	303,310	87,545	9 & 6	9, 8, 6	9 conning tower.	13 to 10 3″–2″	4	18-ton M.L.R., 8 12-ton do., 4 4·7-in. Q.F., 6 6-pdr. do., 14 3-pr. do., 7 M., 3 l.	2 l. car.	13·6	1150	5200
t. 2nd c.	**Neptune** (iron) (Copper sheathed.)		9310	6000	300	0	63	0	26	1	Poplar	Penn	1878	600,000 (purchased).		12 to 9	8 & 6	11 & 13	11 to 13 3″–2″	4	38-ton M.L.R., 2 12-ton do., 6 6-pr. Q.F., 8 3-pr. do., 11 M., 2 l.	2 l. car.	13·4	670	1480
t. 1st cl.	**Nile** (steel)	2 *s.*	11,940	12,000	345	0	73	0	27	6	Pembroke	Maudslay	1890	Total. 819,717		20 to 16 *comp.*	18 to 14 *comp.*	18 *comp.*	6 3″	4	67-ton, 6 4·7-in. Q.F., 8 6-pr. do., 12 3-pr. do., 7 M., 3 l.	4 f. tu. (2 sub.)	16·7	1200	6500
a.c. 1st cl.	**Northampton** (iron) (Zinc sheathed.)	2 *s.*	7630	4500	280	0	60	0	25	9	Glasgow	Penn	1878	296,836	98,968	9 & 6	9, 8, 6	9 conning tower.	13, 10 3″–2″	4	18-ton M.L.R., 8 12-ton do., 6 6-pdr. Q.F., 8 3-pr. do., 10 M., 3 l.	2 l. car.	12·6	1150	3850
a.c. 1st cl.	**Northumberland** (iron)		10,780	(*t*) 4381	400	4	59	5	27	1	Millwall	Penn	1868	391,481	79,871	5½	4½	5½ conning tower.	10	7	12-ton M.L.R., 20 9-ton do., 1 6-in., 1 5-in., 6 4·7-in. Q.F., 10 3-pdr. do., 6 M., 5 l.	4 l. car.	(*t*) 13·3	756	1270
c.d.s. 2nd c. *c.b.*	**Orion** (iron)	2 *s.*	4870	2600	245	0	52	0	21	4	Poplar	Maudslay	1882	239,270	52,959	12, 10, 8, 7	9, 6, 5	9 conning tower.	16 & 9 3′–1″	4	25-ton M.L.R., 6 6-pdr. Q.F., 8 M., 2 l.	4 l. car.	11·9	520	1830
a.c. 1st cl.	**Orlando** (steel)	2 *s.*	5600	8500	300	0	56	0	22	6	Jarrow	Palmer	1888	*x* 206,647	*y* 60,165	10 *comp.*	16 *comp.*	12 C. T. *comp.*	6 3″–2″	2	22-ton, 10 6-in., 6 6-pdr. Q.F., 10 3-pr. do., 7 M., 3 l.	2 l. car.	18·1	900	8000
c.d.s. *c.b.*	**Penelope** (iron)	2 *s.*	4470	2700	260	0	50	0	17	6	Pembroke	Maudslay	1868	145,993	40,855	6 & 5	4½	..	10 & 11	8	9-ton M.L.R., 4 3-pdr. Q.F., 11 M., 4 l.	..	11·0	470	1360
c.d.s. *t.*	**Prince Albert** (iron)	.	3880	1300	240	0	48	1	20	4	Poplar	Humphrys	1866	178,537	24,129	4½	..	10 & 5½	18 ¾″	4	12-ton M.L.R., 6 M., 2 l.	..	9·7	230	930
b. 1st cl.	**Prince George**	.	14,900	12,000	390	0	75	0	27	6	Portsm'th	Humphrys	Bldg.	..		9 H. S.	14 to 9 H. S.	14 to 8 H. S.	.. 4″–2½″	4	12-in. wire, 12 6-in. Q.F., 16 12-pr. do., 12 3-pr. do., 2 l.	5 f. tu. (4 sub.)	17·5	1850	6800

(*t*) On Trial. *x* Includes Hydraulic Machinery, Gun Mountings, &c. *y* Propelling Machinery.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Completion.	Cost. Hull.	Cost. Machinery.	Armour. Side.	Armour. Bulk-head.	Armour. Turret or Barbette	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dischargers.	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
		tons.		ft. in.	ft. in.	ft. in				£	£	in.	in.	in.	in.			knots.	tons.	knots.
b. 1st cl.	Ramillies . 2 s. (steel)	14,150	13,000	380 0	75 0	27 6	Glasgow	Thomson	1893	Total. 874,255		18 *comp.* 5 above the belt.	16 *comp.*	17 *comp.*	.. 3″	4 67-ton, 10 6-in. Q.F., 16 6-pr. do., 12 3-pr. do., 8 M., 2 l.	7 f. tu. or l. car (2 sub.)	17·5	900	5000
b. 1st cl.	Renown . . 2 s. (steel, cop. shd.)	12,350	12,000	380 0	72 0	26 9	Pembroke	Maudslay	Bldg.	Total 679,136		8 to 6 H. S.	10 to 6 H. S.	10 H. S.	.. 3″–2″	4 10-in. 29-ton, 10 6-in. Q.F., 8 12-pr. do., 12 3-pr. do., 7 M., 2 l.	7 f. tu. or l. car. (2 sub.)	18·6	800	..
b. 1st cl.	Repulse (steel) 2 s.	14,150	13,000 (*t*) 11,315	380 0	75 0	27 6	Pembroke	Humphrys	1891	841,274		18 *comp.* 5 above the belt.	16 *comp.*	17 *comp.*	.. 3″	4 67-ton, 10 6-in. Q.F., 16 6-pr. do., 12 3-pr. do., 8 M., 2 l.	7 f. tu. or l. car. (2 sub.)	17·5 17·5 by log	900	5000
b. 1st cl.	Resolution . 2 s. (steel)	14,150	13,000 (*t*) 11,402	380 0	75 0	27 6 24 8	Jarrow .	Palmer .	1893	Total. 852,755		18 *comp.* 5 above the belt.	16 *comp.*	17 *comp.*	.. 3″	4 67-ton, 10 6-in. Q.F., 16 6-pr. do., 12 3-pr. do., 8 M., 2 l.	7 f. tu. or l. car. (2 sub.)	17·5 17·9 by log	900	5000
b. 1st cl.	Revenge . 2 s. (steel)	14,150	13,000 (*t*) 11,536	380 0	75 0	27 6 25 6	Jarrow .	Palmer .	Bldg. Ld. 1892	Total. 852,755		18 *comp.* 5 above the belt.	16 *comp.*	17 *comp.*	.. 3″	4 67-ton, 10 6-in. Q.F., 16 6-pr. do., 12 3-pr. do., 8 M., 2 l.	7 f. tu. or l. car. (2 sub.)	17·5 17·5 by log	900	5000
b. 1st cl.	Rodney (steel) 2 s.	10,300	11,500	325 0	68 0	27 3	Chatham	Humphrys	1888	*x* 563,878	*y* 105,400	18 *comp.*	16 *comp.*	11½ to 10 *comp.*	15 to 12 3″–2½″	1 69-ton, 3 67-ton, 6 6-in. 5-ton, 12 6-pr. Q.F., 10 3-pr. do., 6 M., 2 l.	4 l. car.	16·75	1200	8500
b. 1st cl.	Royal Oak . 2 s. (steel)	14,150	13,000 (*t*) 11,571	380 0	75 0	27 6 25 0	Birkenh'd	Laird .	1894	Total. 877,378		18 *comp.* 5 above the belt	16 *comp.*	17 *comp.*	.. 3″	4 67-ton, 10 6-in. Q.F., 16 6-pr. do., 12 3-pr. do., 8 M., 2 l.	7 f. tu. or l. car. (2 sub.)	17·5 18¼ by log	900	5000
b. 1st cl.	Royal Sovereign 2 s. (steel)	14,150	13,312	380 0	75 0	27 6	Portsm'th	Humphrys	1892	Total. 824,583		18 *comp.* 5 above the belt	16 *comp.*	17 *comp.*	.. 3″	4 67-ton, 10 6-in. Q.F., 16 6-pr. do., 12 3-pr. do., 8 M., 2 l.	7 f. tu. or l. car. (2 sub.)	(*b*) 18·0	900	5000

c.d.s. *t.*	Rupert (iron) 2 *s.*	5440	6000	250	0	53	0	23	7	Chatham	Portsm'th	1874	193,171	39,506	11 & 9	12 breast-work.	14 & 12	14 & 10 3″–2″	2	22-ton, 2 6-in., 4 6-pr. Q.F., 6 3-pr. do., 2 M., 2 l.	4 l. car.	14·0	480	1340
t. 1st cl	**Sans Pareil** . 2 *s.* (steel)	10,470	14,000	340	0	70	0	27	3	Blackwall	Humphrys	1889	609,109 *x*	110,333 *y*	16 to 18 *comp.*	16 *comp.*	18 *comp.*	6 3″	2	111-ton, 1 29-ton 12 6-in., 12 6-pr. Q.F., 12 3-pr. do., 8 M., 2 l.	4 f. tu. (2 sub.) 2 l. car.	17·2	1200	7000
c.d.s. *t.*	**Scorpion** (iron)	2750	1000	224	6	42	4½	16	11	Birkenh'd	Laird	1865	92,033	18,540	4½	..	5	10 to 8	4	12-ton. M.L.R., 6 M., 1 l.	..	8·5	320	1210
a.c. 1st cl.	**Shannon** (iron) (Zinc sheathed.)	5390	2500	260	0	54	0	23	4	Pembroke	Laird	1877	233,902	53,367	9, 8, 6	9 & 8	9 C. T.	10 & 12 3″–1″	2	18-ton M.L.R., 7 12-ton do., 11 M., 8 l.	2 l. car.	11·2	580	2260
c.b. 3rd c.	**Sultan** . (iron) (under repair.)	9290	8000	325	0	59	0½	27	6	Chatham	Thomson New Machinery.	1871	281,373	76,042	9, 8, 6	6 to 4½	..	12 & 10	8	18-ton M.L.R., 4 12½-ton do., 4 4·7-in. Q.F., 9 6-pdr. do., 13 3-pr. do., 7 M., 2 l.	4 f. tu.	14·0	810	2140
c.b. 2nd c.	**Superb** . (iron)	9170	8500	332	3	59	0	26	5	Blackwall	Maudslay	1880	443,000 (purchased)		12, 10,	7, 10, 7, 5	6 8 C. T.	7 to 12 1½″	16	18-ton M.L.R., 6 4-in., 6 6-pdr. Q.F., 10 3-pdr. do., 6 M., 3 l.	4 l. car.	15·0	970	1810
c.b. 3rd c.	**Swiftsure** (iron) (Copper sheathed.)	6910	3500	280	0	55	0	26	0	Jarrow	Maudslay	1872	207,940	49,141	8 to 6	6, 5, 4	..	10	10	12-ton M.L.R., 8 4-in., 4 3-pr. Q.F., 12 M., 3 l.	4 l. car.	12·6	540	1630
c.b. & *b.* 2nd c.	**Temeraire** . 2 *s.* (iron) (Zinc sheathed)	8540	6500	285	0	62	0	27	2	Chatham	Humphrys	1877	352,015	102,954	11, 10, 9, 8	8—5	10 fore 8 after barbette	12 & 10 1½″–1″	4	25-ton M.L.R., 4 18-ton do., 6 4-in., 4 6-pdr. Q.F., 10 3-pr. do., 8 M., 4 l.	2 l. car.	13·8	620	2680
t. 2nd c.	**Thunderer** . 2 *s.* (iron)	9330	7000	285	0	62	3	27	0	Pembroke	Maudslay	1877	306,084	52,458	12 & 10	12 & 10 breast-work.	14 & 12	18 to 16 3″–2″	4	10-in. 29-ton, 6 6-pdr. Q.F., 8 3-pr. do., 4 M., 2 l.	2 f. tu.	14·0	1600	3040
t. 1st cl.	**Trafalgar** . 2 *s.* (steel)	11,940	12,000	345	0	73	0	27	6	Portsm'th	Humphrys	1890	765,794 *x*	97,000 *y*	20 to 16 *comp.*	18 to 14 *comp.*	18 *comp.*	6 3″	4	67-ton, 6 4·7-in. Q.F., 8 6-pr. do., 12 3-pdr. do., 6 M., 3 l.	4 f. tu. (2 sub.) 2 l. car.	16·7	1200	6500
c.b. 3rd c.	**Triumph** . (iron) (Copper sheathed.)	6640	3500	280	0	55	0	26	2	Jarrow	Maudslay	1873	209,109	49,213	8 to 6	6, 5, 4	..	10	10	12-ton M.L.R., 4 5-in., 8 6-pr. Q.F., 8 3-pr. do., 5 M., 3 l.	4 l. car.	12·6	550	1680

(*b*) Calculated from revolutions from data obtained on measured mile. (*t*) On Trial. *x* Includes Hydraulic Machinery, Gun Mountings &c. *y* Propelling Machinery.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Indicated Horse-Power	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Completion.	Cost. Hull.	Cost. Machinery.	Armour. Side.	Armour. Bulk-head.	Armour. Turret, or Barbette	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dischargers.	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
		tons.		ft. in.	ft. in.	ft. in.				£	£	in.	in.	in.	in.			knots.	tons.	knots.
a.c. 1st cl.	Undaunted 2 *s.* (steel)	5600	8500	300 0	56 0	22 6	Jarrow	Palmer Co.	1889	*x* 195,890	*y* 60,165	10 *comp.*	16 *comp.*	12 C.T. *comp.*	6 3″–2″	2 22-ton, 10 6-in., 6 6-pr. Q.F., 10 3-pdr. do., 7 M., 3 l.	4 l. car.	18·1	900	8000
b. 1st cl.	Victorious . 2 *s.*	14,900	12,000	390 0	75 0	27 6	Chatham	..	bldg.	..	..	9 H. S.	14 to 9 H. S.	14 to 8 6-in. casemts.	.. 4″–2½″	4 12-in. wire, 12 6-in. Q F., 16 12-pr. do., 12 3-pr. do., 8 M., 2 l.	5 f. tu. (4 sub.)	17·5	1850	6800
a.c. 1st cl.	Warrior . (iron) (ineffective.)	9210	4000	380 2	58 4	26 9	Blackwall	Penn	1861	282,284	74,409	4½	4½	..	18 to 10	4 9-ton, 28 6½-ton do., 8 M., 4 l.	..	12·7	790	1210
a.c. 1st cl.	Warspite . 2 *s.* (Copper sheathed.)	8400	10,000	315 0	62 0	27 4	Chatham	Penn	1888	*x* 415,546	*y* 113,786	10 *comp.*	9 *comp.*	8 barbette.	10 4″–2″	4 22-ton, 10 6-in., 4 6-pdr. Q.F., 9 3-pdr. do., 6 M., 2 l.	2 f. tu. 4 l. car.	16·75	1130	7000
c.d.s. *t.*	Wivern . (iron)	2750	1000	224 6	42 4	17 0	Birkenh'd	Laird	1865	98,118	18,396	4½	..	5	8 to 10	4 12-ton M.L.R., 8 M., 1 l.	..	8·5	300	1150

The following, which appear in the Official Navy List, belong to India and Australia:—

Class.	NAME.	Displacement.	Indicated Horse-Power	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Completion.	Cost. Hull.	Cost. Machinery.	Armour. Side.	Armour. Bulk-head.	Armour. Turret, or Barbette	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dischargers.	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
c.d.s. *t.*	Abyssinia* (iron) 2 *s* (*Indian Marine.*)	2900	900	225 0	42 0	14 6	Poplar	Dudgeon	1870	97,049	19,500	7 & 6	8 & 7 breastwork.	10 & 8	11 to 9 1½″–1″	4 8-in. 14-ton, 7 M., 2 l.	..	9·0	92	..
c.d.s. *t.*	Cerberus† (iron) 2 *s.* (*Colonial Marine.*)	3480	1660	225 0	45 0	15 3	Jarrow	Maudslay	1870	99,331	18,225	8 to 6	9 to 8 breastwork.	10 & 9	11 to 9 1½″–1″	4 10-in. 18-ton M.L.R., 4 M.	..	9·75	120	..
c.d.s. *t.*	Magdala* (iron) 2 *s.* (*Indian Marine.*)	3340	1400	225 0	45 0	15 3	Blackwall	Ravenhill	1870	115,400	17,000	8 to 6	9 to 8 breastwork.	10 & 9	11 to 9 1½″–1″	4 8-in. 14-ton, 7 M., 2 l.	..	10·0	120	..

* At Bombay. † At Melbourne. *x* Includes Hydraulic Machinery, Gun Mountings, &c. *y* Propelling Machinery.

GREAT BRITAIN.—Unarmoured Cruising Ships, &c.

Class.	NAME.	Material of Hull.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Launch.	Cost. Hull.	Cost. Machinery.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
			Tons.		ft. in.	ft. in.	ft. in.				£	£			knots.	tons.	knots.
Sloop . . .	Acorn . .	Comp.	970	1200	167 0	32 0	14 0	Milford Haven	Maudslay.	1884	27,500	14,500	8 5-in. 38-cwt., 8 M., 1 l. .	..	12·2	150	1900
Cruiser (2nd class) . .	Active . .	Iron cop. shd.	3080	2400	270 0	42 0	21 4	Blackwall	Humphrys	1869	85,795	40,361	10 6-in., 2 64-pdrs. M.L.R., 9 M., 2 l.	2 l. car.	15·10	410	2000
" " P. 2″–1″	Æolus . 2 s.	Steel cop. shd.	3600	9000	300 0	43 0	17 6	Devonp'rt	Hawthorn.	1892	Total. 208,450		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3 pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·75	400	8000
Desp. Vessel .	Alacrity . 2 s.	Steel	1700	3000	250 0	32 6	14 0	Jarrow .	Palmer .	1885	x 48,289	y 29,680	10 6-pdr. Q.F., 2 M. . .	..	17·00	400	6450
1st Class Torpedo Gun Boat .	Alarm . 2 s.	Steel	810	3884	230 0	27 0	8 9	Sheerness	Penn .	1892	Total. 59,346		2 4·7-in. Q.F., 4 3-pdr. do. .	5 tu.	19·25 19·2	100	2500
Gun Boat (2nd class) . .	Albacore . .	Comp.	560	500	135 0	26 0	10 6	Birkenh'd	Laird .	1883	18,000	10,556	2 5-in., 2 4-in., 2 M. . .	..	(t) 11·0	85	..
Sloop . . .	Alert . .	Steel cop. shd.	960	1400	180 0	32 6	11 6	Sheerness	Sheerness .	1894	Total. 59,566		6 4-in. 25-pdr. Q.F., 4 3-pdr. do., 2 M.	..	13·25	130	..
Sloop . . .	Algerine 2 s.	..	1050	1400	185 0	32 6	11 3	Devonp'rt	Devonport.	Bldg.	61	774	6 4-in. 25-pdr. Q.F., 4 3-pdr. do., 3 M.	..	13·0	160	..
Cruiser (2nd class) . pp. 1½″	Amphion 2 s.	Steel	4300	5000	300 0	46 0	20 6	Pembroke	Maudslay.	1883	95,000	65,500	10 6-in. 5-ton, 4 3-pdr. Q.F., 13 M., 2 l.	4 l. car.	16·6	1000	11,000
" " . P. 2″–1″	Andromache 2 s.	Steel	3400	9000	300 0	43 0	16 6	Chatham.	Earle .	1890	Total. 186,280		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	20·0	400	8000
1st Class or Torpedo Gun Boat	Antelope 2 s.	Steel	810	3621	230 0	27 0	8 9 10 0 (t)	Devonp'rt	Yarrow .	1893	Total. 61,397		2 4·7-in. Q.F., 4 3-pdr. do. .	5 tu.	19·25 19·0	100	..
Cruiser (2nd class) . P. 2″–1″	Apollo . .	Steel	3400	9000	300 0	43 0	16 6	Chatham.	Earle .	1891	Total. 186,361		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	(t) 20·0	400	8000
Cruiser (3rd class) . .	Archer . 2 s.	Steel	1770	3500	225 0	36 0	14 6	Glasgow .	Thomson .	1885	x 55,916	y 31,667	6 6-in. 8 3-pr. Q.F., 2 M., 1 l.	1 f. tu. 2 l. car.	16·5	475	7000

(t) On steam trials.

GREAT BRITAIN.—Unarmoured Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Launch.	Cost. Hull.	Cost. Machinery.	Armament. Guns.	Armament. Fish Torpedo Dischargers	Speed.	Coal Endurance. Coal that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
			tons.		ft. in.	ft. in.	ft. in.				£	£			knots.	tons.	knots.
Cruiser (2nd class) . pp. 1½″	Arethusa 2 s.	Steel	4300	5000	300 0	46 0	20 6	Glasgow .	Napier .	1882	86,763	58,435	10 6-in., 8 3-pdr. Q.F., 6 M., 2 l.	4 l. car	16·6 17·00	1000	11,000
" " P. 2″–1″	Astrea . 2 s.	Steel cop. shd.	4360	9112	320 0	49 6	19 0 18 9½ (t)	Devonp'rt	Devonport	1893	Total. 244,831		2 6-in. Q.F., 8 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 tr. do.	19·75 by log.	400	..
Cruiser (3rd class) . P. 2″–1″	Barham . 2 s.	Steel	1830	4700	280 0	35 0	13 3	Portsm'th	Hawthorn .	1889	Total. 113,302		6 4·7-in. Q.F., 4 3-pdr. do., 2 M.	2 l. car.	18·6	140	2600
" " P. 2″–1″	Barracouta 2 s.	Steel	1580	3000	220 0	35 0	14 0	Sheerness	Palmer .	1889	Total. 96,615		6 4·7-in. Q.F., 4 3-pdr. do., 2 M.	2 l. car.	16·5	160	3400
" " . P. 2″–1″	Barrosa . 2 s.	Steel	1580	3000	220 0	35 0	14 0	Portsm'th	Palmer .	1889	Total. 79,238		6 4·7-in. Q.F., 4 3-pdr. do., 2 M.	2 l. car.	16·5	160	3400
Sloop . . .	Basilisk . 2 s.	Steel cop. shd.	1170	2000	195 0	28 0	12 6	Sheerness	Rennie .	1889	Total. 58,013		8 5-in., 8 M.	..	14·7	160	3000
" . . .	Beagle . 2 s.	Steel cop. shd.	1170	2000	195 0	28 0	12 6	Portsm'th	Rennie .	1889	Total. 56,474		8 5-in, 8 M.	..	14·5	160	3000
Cruiser (3rd class) . P. 2″–1″	Bellona . 2 s.	Steel	1830	4700	280 0	35 0	13 3	Newcastle	Hawthorn .	1890	Total. 94,195		6 4·7-in. Q.F., 4 3-pdr. do., 2 M.	2 l. car.	17·8	140	2600
Cruiser (1st class) . P. 6″–3″	Blake . 2 s.	Steel	9000	20,000 (t) 14,450	375 0	65 0	25 9	Chatham .	Maudslay .	1889	Total. 440,471		2 22-ton, 10 6-in. Q.F., 16 3-pdr. Q.F., 7 M., 2 l.	2 f. tu. (sub.) 2 l. car	22·0 (t) 19·12	1500	15,000
Cruiser (3rd class) . P. 2″–1″	Blanche . 2 s.	Steel cop. shd.	1580	3000	220 0	35 0	14 0	Pembroke	Earle .	1889	Total. 91,112		6 4·7-in. Q.F., 4 3-pdr. do., 2 M.	2 l. car.	16·5	160	3400

Cruiser (1st class)	P. 6″–3″	Blenheim	2 s.	Steel	9000	21,411	375 0	65 0	25 9	Thames Ironworks	Humphrys	1890	425,591		2 22-ton, 10 6-in. Q.F., 16 3-pdr. do., 7 M., 2 l.	2 f. tu. (sub.) 2 l. car.	21·6	1500	15,000
Cruiser (3rd class)	P. 2″–1″	Blonde	2 s.	Steel cop. shd.	1580	3000	220 0	35 0	14 0	Pembroke	Earle	1889	Total. 90,059		6 4·7-in. Q.F., 4 3-pdr. do., 2 M.	2 l. car.	16 7	160	3400
Cruiser (2nd class)		Boadicea		Iron cop. shd.	4140	4500	280 0	45 0	23 8	Portsm'th	Rennie	1875	153,167	70,409	2 6-in., 12 90-cwt. M.L.R., 4 6-pdr. Q.F., 2 3-pdr. do., 10 M., 2 l.	2 l. car.	14·7	570	3000
Cruiser (2nd class)	P. 2″–1″	Bonaventure	2 s.	Steel cop. shd.	4360	9000 9365 (t)	320 0	49 6	19 0 18 9 (t)	Devonp'rt	Hawthorn	1892	Total 247,128		2 6-in. Q.F., 8 4·7-in. do., 8 6-pdr. do., 1 3-pr. do., 4 M., 1 l.	2 f. tu. 2 tr. do.	19·5 20·0 (t)	400	..
1st Class or Torpedo Gun Boat		Boomerang (Special for Australia)	2 s.	Steel	735	3500	230 0	27 0	8 3	Elswick	Bellis	1889	Total. 49,962		2 4·7-in. Q.F., 4 3-pdr. do., 1 M.	1 f. tu. 2 l. car.	20·0	100	2500
Gun Boat (1st class)		Bramble	2 s.	*Comp.*	715	1000	165 0	29 0	11 0	Belfast	Harland	1886	39,835	10,000	6 4-in., 4 M.	..	13·0	105	2500
Cruiser (2nd class)	P. 2″–1″	Brilliant	2 s.	Steel cop. shd.	3600	9164	300 0	43 8	17 6	Sheerness	Hawthorn	1891	Total. 204,228		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·7	400	8000
Cruiser (3rd class)		Brisk	2 s.	Steel	1770	3500	225 0	36 0	14 3½	Glasgow	Thomson	1886	55,916	31,667	6 6-in., 8 3-pdr. Q.F., 2 M., 1 l.	1 f. tu. 2 l. car.	16·5	325	4850
Gun Boat (2nd class)		Bullfrog (Harbour service)		*Comp.*	465	360	125 0	23 6	9 6	Pembroke	Maudslay	1881	16,300	6,050	2 64-pdr. M.L.R., 2 20-pdr., 2 M.	..	9·8	40	..
Sloop		Buzzard	2 s.	*Comp.*	1140	2000	195 0	28 0	11 6	Sheerness	Barrow	1887	42,500	16,200	8 5-in., 8 M.	..	14·50	160	3000
Cruiser (3rd class)	pp. 1½″	Calliope		Steel cop. shd.	2770	4020	235 0	44 6	19 11	Portsm'th	Rennie	1884	82,000	38,000	4 6-in., 12 5-in. 38-cwt., 10 M., 2 l.	2 l. car.	14·6	550	4000
" "	pp. 1½″	Calypso		Steel cop. shd.	2770	4000	235 0	44 6	19 11	Chatham	Rennie	1883	82,000	37,500	4 6-in., 12 5-in. 38 cwt., 10 M., 2 l.	2 l. car.	14·6	550	4000
Cruiser (2nd class)	P. 2″–1″	Cambrian	2 s.	Steel cop. shd.	4360	9000 9259 (t)	320 0	49 6	19 0 19 0½ (t)	Pembroke	Hawthorn	1893	Total. 236,919		2 6-in. Q.F., 8 4·7-in. do., 8 6-pdr. do., 1 3-pr. do., 4 M., 1 l.	2 f. tu. 2 tr. do.	19·5 20·44 (t)	400	..
Cruiser (3rd class)	pp. 1½″	Canada		Steel cop. shd.	2380	2000	225 0	44 6	19 1	Portsm'th	Rennie	1881	78,000	26,500	10 6-in. 5-ton, 8 M., 2 l.	2 l. car.	12·75	470	5400

(t) On steam trial. *x* Includes Gun Mountings, &c. *y* Propelling Machinery.

GREAT BRITAIN.—Unarmoured Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Launch.	Cost. Hull.	Cost. Machinery.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
			tons.		ft. in.	ft. in.	ft. in.				£	£			knots.	tons.	knots.
Cruiser (3rd class) . pp. 1¼"	Caroline .	*Comp.*	1420	1400	200 0	38 0	15 9	Sheerness	Maudslay .	1882	56,000	15,000	14 5-in. 38-cwt., 8 M., 1 l. .	..	12·6	400	6400
" " pp. 1½"	Carysfort.	Steel cop. shd.	2380	2000	225 0	44 6	19 3	Glasgow .	Elder .	1878	84,512	29,942	2 90-cwt. M.L.R., 12 64-pdr. do., 6 M., 2 l.	2 l. car.	12·75	470	3840
" " pp. 1½"	Champion	Steel cop. shd.	2380	2000	225 0	44 6	19 3	Glasgow .	Elder .	1878	84,288	29,695	4 6-in., 8 5-in., 4 3-pdr. Q.F., 6 M., 2 l.	2 l. car.	12·75	470	3840
Cruiser (2nd class) . P. 2"–1"	Charybdis 2 s.	Steel cop. shd.	4360	9000 9137 (t)	320 0	49 6	19 0 19 0 (t)	Sheerness	Earle .	1893	Total. 237,344		2 6-in. Q.F., 8 4·7-in do., 8 6-pdr. do., 1 3-pr. do., 4 M., 1 l.	2 f. tu. 2 tr. do.	19·5 20·5 (t)	400	..
1st Class or Torpedo Gun Boat	Circe . 2 s.	Steel	810	3500 3508 (t)	230 0	27 0	8 9	Sheerness	Penn .	1892	Total. 61,979		2 4·7-in. Q.F., 4 3-pdr. do.	5 tu.	19·25 19·3 (t)	100	2500
Cruiser (3rd class) . pp. 1½"	Cleopatra	Steel cop. shd.	2380	2000	225 0	44 6	19 3	Glasgow .	Humphrys	1878	86,126	27,798	4 6-in., 8 5-in., 4 3-pdr. Q.F., 6 M., 2 l.	2 l. car.	13·0	470	3280
Gun Boat (2nd class) . .	Cockchafer .	*Comp.*	465	360	125 0	23 6	9 6	Pembroke	Maudslay .	1881	16,000	61,000	2 64-pdr. M.L.R., 2 20-pdr., 2 M.	..	9·8	40	..
Cruiser (3rd class) . pp. 1½"	Comus .	Steel cop. shd.	2380	2000	225 0	44 6	19 3	Glasgow .	Elder .	1878	84,497	29,477	10 6-in., 8 M., 2 l.	2 l. car.	12·75	470	3800
" " pp. 1½"	Conquest .	Steel cop. shd.	2380	2000	225 0	44 6	19 3	Glasgow .	Humphrys	1878	83,707	27,205	9 6-in., 8 M., 2 l.	2 l. car.	13·0	470	3280
" " pp. 1½"	Constance	Steel cop. shd.	2380	2000	225 0	44 6	19 3	Chatham .	Penn .	1880	78,000	32,000	2 90-cwt. M.L.R., 12 64-pdr. do., 6 M., 2 l.	2 l. car.	13·0	470	5000
" " pp. 1½"	Cordelia .	Steel cop. shd.	2380	2000	225 0	44 6	19 3	Portsm'th	Rennie .	1881	78,000	26,500	10 6-in. 5-ton, 10 M., 2 l.	2 l. car.	12·75	470	5400

Cruiser (3rd class)	.	Cossack .	2 s.	Steel	1770	3500	225	0	36	0	14	3½	Glasgow .	Thomson .	1886	x 55,916	y 31,667	6 6-in., 8 3-pdr. Q.F., 2 M., 1 l.	1 f. tu. 2 l. car.	16·5	325	4850
Cruiser (1st class)	. P. 5″–1″	Crescent .	2 s.	Steel cop. shd.	7700	12,000 10,378 (t)	360	0	60	0	23	9	Portsm'th	Penn .	1892	Total. 383,068		1 22-ton, 12 6-in. Q.F., 12 6-pdr. do., 5 3-pdr. do., 7 M., 2 l.	2 f. tu. (sub.) 2 tr. do.	19·7	850	10,000
Cruiser (3rd class)	. pp. 1½″	Curaçoa .	.	Steel cop. shd.	2380	2000	225	0	44	6	19	3	Glasgow .	Humphrys	1878	85,833	27,098	4 6-in., 8 5-in., 1 3-pdr. Q.F., 9 M., 2 l.	2 l. car.	13·0	470	3280
Gun Vessel (1st class)	.	Curlew .	2 s.	Steel	950	1200	195	0	28	0	10	6	Devonp'rt	Penn .	1885	x 37,363	y 12,600	1 6-in. 3 5-in., 7 M. . .	1 b. tu. 2 l. car.	14·5	250	10,000
Sloop . .	.	Daphne .	2 s.	*Comp.*	1140	2000	195	0	28	0	11	6	Sheerness	Greenock F'ndry Co.	1888	x 42,400	y 15,200	8 5-in., 8 M. . . .	..	14·0	160	..
Cruiser (2nd class)	. P. 2½″	Diana .	2 s.	Steel cop. shd.	5600	9600	350	0	53	0	20	6	Glasgow .	Elder .	Bldg.	250,435		5 6-in. Q.F., 6 4·7-in. do., 8 12-pdr. do., 7 3-pdr. do., 4 M., 1 l.	3 f. tu. (2 sub.)	19·5	550	..
Cruiser (2nd class)	. P. 2½″	Dido .	2 s.	Steel cop. shd.	5600	9600	350	0	53	0	20	6	Glasgow .	London and Glasgow Co.	Bldg.	251,244		5 6-in. Q.F., 6 4·7-in. do., 8 12-pdr. do., 7 3-pdr. do., 4 M., 1 l.	3 f. tu. (2 sub.)	19·5	550	..
Sloop . .	.	Dolphin .	.	*Comp.*	925	750	157	0	32	0	14	0	Middl'sbro	Hawthorn.	1882	25,850	9,800	2 6-in., 2 5-in., 3 M., 2 l. .	..	11·3	135	1700
Cruiser (2nd class)	. P. 2½″	Doris .	2	Steel cop. shd.	5600	9600	350	0	53	0	20	6	Barrow .	Barrow .	Bldg.	252,123		5 6-in. Q.F., 6 4·7-in. do., 8 12-pdr. do., 7 3-pdr. do., 4 M., 1 l.	3 f. tu. (2 sub.)	19·5	550	..
1st Class or Torpedo Gun Boat		Dryad .	2 s	Steel	1070	3500 3709 (t)	250	0	30	6	9	0	Chatham	Maudslay .	1893	Total. 73,491		2 4·7-in. Q.F., 4 6-pdr. do. .	5 tu.	19·0 18·2 (t)	100	2800
Cruiser (2nd class)	. P. 2½″	Eclipse .	2 s.	Steel cop. shd.	5600	9600	350	0	53	0	20	3	Portsm'th	Portsm'th	1894	278,045		5 6-in. Q.F., 6 4·7-in. do., 8 12-pr. do., 1 3-pr. do., 4 M., 1 l.	5 f. tu. (2 sub.)	19·5	550	..
Cruiser (1st class)	. P. 5″–1″	Edgar .	2 s.	Steel	7350	13,260	360	0	60	0	23	9	Devonp'rt	Elder .	1890	Total. 401,083		2 22-ton, 10 6-in. Q.F., 12 6-pdr. do., 5 3-pdr. do., 7 M., 2 l.	4 tu. (2 sub. 2 tr.)	20·5	850	10,000
Sloop . .	.	Egeria (Surveying Service)		*Comp.*	940	700	160	0	31	4	14	3	Pembroke	Humphrys	1873	32,468	10,414	4 20-pdr., 2 M., 1 l. . .	..	11·3	100	1000
Cruiser (3rd class)	.	Emerald .	.	*Comp.*	2120	1800	220	0	40	0	19	0	Pembroke	Thomson .	1876	72,312	26,130	4 6-in., 8 5-in., 7 M., 2 l. .	..	12·2	250	2280

(t) On steam trial. x Includes Gun Mountings, &c. y Propelling Machinery.

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GREAT BRITAIN.—Unarmoured Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Launch.	Cost. Hull.	Cost. Machinery.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
			tons.		ft. in.	ft. in.	ft. in.				£	£			knots.	tons.	knots.
Cruiser . P. (1st Class) 5″–1″	Endymion 2 s.	Steel	7350	12,000 10,662 trial.	360 0	60 0	23 9	Hull	Earle	1891	Total. 350,459		2 22-ton, 10 6-in. Q.F., 12 6-pdr. do., 5 3-pdr. do., 7 M., 2 1.	4 tu. (2 sub. 2 tr.)	20·0	850	10,000
Sloop . . .	Espiegle . .	*Comp.*	1130	800	170 0	36 0	16 3	Devonp'rt	Maudslay .	1880	37,000	11,770	10 5-in., 8 M., 1 l. . . .	..	11·5	150	1480
Cruiser . . (3rd class)	Fearless . 2 s.	Steel	1580	3200	220 0	34 3	14 6	Barrow .	Barrow .	1886	x64,202	23,250	4 5-in., 8 3-pdr. Q.F., 2 M., 1 l.	3 f. tu. (1 sub) 4 l. car.	16·7	450	6900
Gun Boat . . (2nd class)	Firebrand .	*Comp.*	455	360	125 0	23 6	10 0	Glasgow .	Thomson	1877	16,500	6,300	2 5-in., 2 4-in., 2 M. . .	..	10·17	40	..
" " .	Firefly (Harbour Service).	*Comp.*	455	360	125 0	23 6	10 0	Glasgow .	Thomson .	1877	16,400	6,300	2 64-pdr. M.L.R., 2 20-pdr., 2 M.	..	9·99	40	..
Cruiser . P. (2nd class) 2″–1″	Flora . 2 s.	Steel cop. shd.	4360	9000 9356 (t)	320 0	49 6	19 0 18 1½ (t)	Pembroke	Barrow .	1893	Total. 241,819		2 6-in. Q.F., 8 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 tr. do.	19·5 20·1 (t)	400	..
Cruiser . P. (2nd class) 2″–1″	Forte . 2 s.	Steel cop. shd.	4360	9000 9335 (t)	320 0	49 6	19 0 19 2 (t)	Chatham	Chatham .	1893	Total. 240,816		2 6-in. Q.F., 8 4·7-in. do., 8 6-pdr., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 tr. do.	19·5 19·85 (t)	400	..
Cruiser P. (2nd class) 3″–2″	Forth . 2 s.	Steel	4050	5700	300 0	46 0	20 0	Pembroke	Hawthorn.	1886	151,952	50,000	2 15-ton, 10 6-in., 3 6-pdr. Q.F., 8 3-pdr. do., 6 M., 2 l.	2 l. car.	16·8	900	8750
" " P. 2″–1″	Fox . . .	Steel cop. shd.	4360	9000 9058 (t)	320 0	49 6	19 0 18 0½ (t)	Portsm'th	Portsm'th	1893	Total. 244,078		2 6-in. Q.F., 8 4·7-in. do., 8 6-pdr., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 tr. do.	19·5 19·9 (t)	400	..

Sloop . .	Gannet .	Comp.	1130	800	170	0 36	0 15	9	Sheerness	Humphrys	1878	39,581	12,889	2 90-cwt. M.L.R., 3 64-pdr. do., 2 5-in. 38-cwt., 6 M., 1 l.	..	11·53	150	1480
Cruiser . . (3rd class)	Garnet . .	Comp.	2120	1800	220	0 40	0 19	7	Chatham.	Hawthorn.	1877	64,689	27,779	14 5-in. 40-cwt., 7 M., 2 l. .	..	12·2	260	2000
Cruiser . P. (1st class) 5″–1″	Gibraltar 2 s.	Steel cop. shd.	7700	12,000 10,445 (t)	360	0 60	0 23	9	Glasgow .	Napier .	1892	Total. 347,634		2 22-ton, 10 6-in. Q.F., 12 6-pdr. do., 5 3-pdr. do., 7 M., 2 l.	4 tu. (2 sub. 2 tr.)	19·7	850	10,000
1st Class or Torpedo Gun Boat	Gleaner . .	Steel	735	3632	230	0 27	0 8	3	Sheerness	Sheerness	1890	Total. 63,798		2 4·7-in. Q.F., 4 3-pdr. do. .	1 f. tu. 2 l. car.	20·1	100	2500
Gun Boat . . (1st class)	Goldfinch .	Comp.	805	1200	165	0 31	0 11	7½	Sheerness	Sheerness	1889	Total. 40,889		6 4-in., 2 3-pdr. Q.F., 2 M. .	..	13·0	105	2500
1st Class or Torpedo Gun Boat	Gossamer .	Steel	735	3600	230	0 27	0 8	3	Sheerness	Sheerness	1890	Total. 54,490		2 4·7-in. Q.F., 4 3-pdr. do. .	1 f. tu. 2 l. car.	19·8	100	2500
Cruiser . P. (1st class) 5″–1″	Grafton . 2 s.	Steel	7350	12,000 13,483 (t)	360	0 60	0 23	9	Blackwall	Humphrys	1892	Total. 351,851		2 22-ton, 10 6-in. Q.F., 12 6-pdr. do., 5 3-pdr. do., 7 M., 2 l.	4 tu. (2 sub. 2 tr.)	20·0	850	10,000
Gun Boat . . (2nd class)	Grappler . (Harbour Service)	Comp.	465	360	125	0 23	6 10	0	Barrow .	Barrow .	1880	15,600	5,250	2 64-pdr. M.L.R., 2 20-pdr., 2 M.	..	9·8	..	..
1st Class or Torpedo Gun Boat	Grasshopper 2 s.	Steel	525	2700	200	0 23	0 8	9	Sheerness	Maudslay	1887	x20,897	y13,168	1 4-in., 6 3-pdr. Q.F. . .	2 f. tu. 2 l. car.	19·0	80	2400
" "	Halcyon . 2 s.	Steel	1070	3500 3546 (t)	250	0 30	6 9	0	Devonp'rt	Hawthorn	Bldg.	Total. 75,091		2 4·7-in. Q.F., 4 6-pdr. do. .	5 tu.	19·0 17·7 (t)	100	2500
" "	Harrier . 2 s.	Steel	1070	3500 3608 (t)	250	0 30	6 9	0	Devonp'rt	Hawthorn	1894	Total. 73,428		2 4·7-in. Q.F., 4 6-pdr. do. .	5 tu.	19·0 19·0 (t)	100	2500
Cruiser . P. (1st class) 5″–1″	Hawke . 2 s.	Steel	7350	12,000	360	0 60	0 23	9	Chatham.	Elder .	1891	Total. 365,491		2 22-ton, 10 6-in. Q.F., 12 6-pdr do., 5 3-pdr. do., 7 M., 2 l.	4 tu. (2 sub. 2 tr.)	20·0	850	10,000
1st Class or Torpedo Gun Boat	Hazard . 2 s.	Steel	1070	3500 3734 (t)	250	0 30	6 9	0	Pembroke	Elder	1894	Total. 74,076		2 4·7-in. Q.F., 4 6-pdr. do.	5 tu.	19·0 19·0 (t)	100	2500

(t) On steam trial. x Includes Gun Mountings, &c. y Propelling Machinery.

GREAT BRITAIN.—Unarmoured Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Launch.	Cost. Hull.	Cost. Machinery.	Armament. Guns.	Armament. Fish Torpedo Dischargers.	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
			tons.		ft. in.	ft. in.	ft. in.				£	£			knots.	tons.	knots.
1st Class or Torpedo Gun Boat	Hebe . 2 s.	Steel	810	3566	230 0	27 0	8 9	Sheerness	Sheerness	1892	Total. 73,433		2 4·7-in. Q.F., 4 3-pdr. do. .	5 tu.	19·25 19·0 (t)	100	2500
Torpedo Depôt Ship.	Hecla . .	Iron	6400	2400	391 7	38 9	24 3	(Purchased) Built and Engined by Harland & Wolff.		1878	Total. 126,190		4 64-pdr. M.L.R., 1 5-in., 1 40-pdr., 14 M.	3 f. tu. 2 l. car.	13·0	2,200	26,400
Cruiser . P. (2nd class) 2″–1″	Hermione 2 s.	Steel cop. shd.	4360	9000 9272 (t)	320 0	49 6	19 0 18 8 (t)	Devonp'rt	Thomson .	1893	Total. 223,267		2 6-in. Q.F., 8 4·7-in. do., 8 6-pdr., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 tr. do.	19·5 19·5 (t)	400	..
Cruiser . pp. (3rd class) 1¼″	Heroine . .	*Comp.*	1420	950	200 0	38 0	15 9	Devonp'rt	Humphrys .	1881	52,500	14,500	8 6-in., 4 M., 1 l.	..	11·4	400	6000
1st Class or Torpedo Gun Boat	Hussar . 2 s.	Steel	1070	3500 3553 (t)	250 0	30 6	9 0	Devonp'rt	Hawthorn .	1894	Total. 72,886		2 4·7-in. Q.F., 4 6-pdr. do. .	5 tu.	19·0 19·7 (t)	100	..
Cruiser . pp. (3rd class) 1¼″	Hyacinth .	*Comp.*	1420	950	200 0	38 0	15 9	Devonp'rt	Humphrys .	1881	52,500	14,500	8 6-in, 4 M., 1 l.	..	11·4	400	6000
Sloop	Icarus . .	*Comp.*	970	1200	167 0	32 0	13 6	Devonp'rt	Barrow .	1885	x39,369	y12,735	8 5-in., 4 3-pdr. Q.F., 4 M., 1 l.	..	12·2	150	2300
Cruiser . . (2nd class)	Inconstant .	Iron cop. shd.	5780	4200	337 4	50 3	25 6	Pembroke	Penn .	1868	138,585	74,739	10 12-ton M.L.R., 6 6½-ton do., 2 3-pdr. Q.F., 11 M., 8 l.	2 l. car.	16·20	750	2780
” ” P. 2″–1″	Indefatigable 2 s.	Steel cop. shd.	3600	9000	300 0	43 8	17 6	Glasgow .	London and Glasgow	1891	Total. 181,024		2 6-in. Q.F., 6 4·7-in. do., 8 6-pr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·75	400	8000
” ” P. 2″–1″	Intrepid . 2 s.	Steel cop. shd.	3600	9471	300 0	43 8	17 6	Glasgow .	London and Glasgow	1891	Total. 181,157		2 6-in. Q.F., 6 4·7-in. do., 8 6-pr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·7	400	8000

Cruiser (2nd class)	P. 2″–1″	Iphigenia	2 s.	Steel cop. shd.	3600	9000	300	0	43	8	17	6	Glasgow	London and Glasgow	1891	Total. 181,879		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·75	400	8000
" "		Iris	2 s.	Steel	3730	6000	300	0	46	0	22	0	Pembroke	Maudslay	1877	110,868	102,318	13 5-in., 4 3-pdr. Q.F., 8 M., 1 l.	4 l. car.	18·0	780	4100
" "	P. 2½″	Isis	2 s.	Steel cop. shd.	5600	9600	350	0	53	0	20	6	Glasgow	London and Glasgow Co.	Bldg.	251,140		5 6-in. Q.F., 6 4·7-in. do., 8 12-pdr. do., 7 3-pr. do., 4 M., 1 l.	3 f. tu. (2 sub.)	19·5	550	..
1st Class or Torpedo Gun Boat		Jaseur	2 s.	Steel	810	3711	230	0	27	0	8	9	Barrow	Barrow	1892	Total. 48,238		2 4·7-in. Q.F., 4 3-pdr. do.	3 tu. (2 rev.)	19·25 19·0 (t)	100	2500
" "		Jason	2 s.	Steel	810	3540	230	0	27	0	8	9	Barrow	Barrow	1892	Total. 49,253		2 4·7-in. Q.F., 4 3-pdr. do.	3 tu. (2 rev.)	19·25 20·0 (t)	100	2500
Cruiser (2nd class)	P. 2½″	Juno	2 s.	Steel cop. shd.	5600	9600	350	0	53	0	20	6	Barrow	Barrow	Bldg.	252,140		5 6-in. Q.F., 6 4·7-in. do., 8 12-pdr. do., 7 3-pr. do., 4 M., 1 l.	3 f. tu. (2 sub.)	19·5	550	..
1st Class or Torpedo Gun Boat		Karrakatta (Special for Australia)	2 s.	Steel	735	3500	230	0	27	0	8	3	Elswick	Bellis	1890	*x* 26,456	*y* 21,193	2 4·7-in. Q.F., 4 3-pdr. do.	1 f. tu. 2 l. car.	20·0	100	2500
Cruiser (3rd class)	P. 2″–1″	Katoomba (Special for Australia)		Steel	2575	7500	265	0	41	0	15	6	Elswick	Hawthorn	1889	Total. 116,719		8 4·7-in. Q.F., 8 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·0	300	4800
Gun Vessel (1st class)		Landrail	2 s.	Steel	950	1200	195	0	28	0	10	6	Devonp'rt	Penn	1886	37,363	12,000	1 6-in., 3 5-in., 4 3-pdr. Q.F., 3 M.	1 b. tu. 2 l. car.	14·5	250	10,000
Gun Boat (1st class)		Lapwing		*Comp.*	805	1200	165	0	31	0	11	7½	Devonp'rt	Devonport	1889	Total. 39,952		6 4-in. 25-cwt., 2 3-pdr. Q.F., 2 M.	..	13·0	105	2500
Cruiser (2nd class)	P. 2″–1″	Latona	2 s.	Steel	3400	9000	300	0	43	0	16	6	Barrow	Barrow	1890	Total. 171,068		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	20·0	400	8000
" "	pp. 1½″	Leander	2 s.	Steel	4300	5000	300	0	46	0	20	6	Glasgow	Napier	1882	87,843	60,610	10 6-in. 5-ton, 4 3-pdr. Q.F., 14 M., 2 l.	4 l. car.	16·6	1000	11,000
1st Class or Torpedo Gun Boat		Leda	2 s.	Steel	810	3597	230	0	27	0	8	9	Sheerness	Penn	1892	Total. 62,145		2 4·7-in. Q.F., 4 3-pdr. do.	5 tu.	19·25 18·3 by log.	100	..
Gun Vessel (2nd class)		Linnet	2 s.	*Comp.*	756	870	165	0	29	0	10	11	Blackwall	Rennie	1880	25,281	10,382	2 90-cwt. M.L.R., 4 6-pdr. Q.F., 2 M.	..	11·80	180	2400
Gun Boat (1st class)		Lizard		*Comp.*	715	1000	165	0	29	0	11	10	Belfast	Harland	1886	42,770	10,000	6 4-in., 4 M.	..	13·0	105	2500
Cruiser (3rd class)	P. 1½″	Magicienne	2 s.	Steel cop. shd.	2950	9000	265	0	42	0	17	6	Glasgow	Hawthorn	1888	Total. 136,000		6 6-in., 9 6-pdr. Q.F., 1 3-pdr. do., 3 M., 1 l.	2 f. tu 2 l. car.	19·0	400	8000

(*t*) On steam trials. *x* Includes Gun Mountings, &c. *y* Propelling Machinery.

GREAT BRITAIN.—Unarmoured Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Launch.	Cost. Hull.	Cost. Machinery.	Armament. Guns.	Armament. Fish Torpedo Dischargers	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
			tons.		ft. in.	ft. in.	ft. in.				£	£			knots.	tons.	knots.
Gun Boat (1st class)	Magpie	*Comp.*	805	1200	165 0	31 0	11 7½	Pembroke	Earle	1889	x29,400	y 9,300	6 4-in., 4 M.	..	13·0	105	2500
Cruiser (3rd class) P. 1½″	Marathon	Steel cop. shd.	2950	9000	265 0	42 0	17 6	Glasgow	Hawthorn	1888	Total. 136,000		6 6-in., 9 6-pdr. Q.F., 1 3-pdr. do., 3 M., 1 l.	2 f. tu. 2 l. car.	19·0	400	8000
Sloop	Mariner	*Comp.*	970	850	167 0	32 0	14 0	Devonp'rt	Hawthorn	1884	37,156	12,841	8 5-in. 38-cwt., 8 M., 1 l.	..	11·50	150	2300
Cruiser (3rd class) P. 1½″	Medea 2 s.	Steel	2800	9000	265 0	41 0	16 6	Chatham	Humphrys	1888	x88,400	y53,300	6 6-in., 9 6-pdr. Q.F., 1 3-pdr. do., 3 M., 1 l.	2 f. tu. 2 l. car.	19·0	400	8000
" " P. 1½″	Medusa 2 s.	Steel	2800	9000	265 0	41 0	16 6	Chatham	Humphrys	1888	x88,400	y53,300	6 6-in., 9 6-pdr. Q.F., 1 3-pdr. do., 3 M., 1 l.	2 f. tu. 2 l. car.	19·0	400	8000
Cruiser (2nd class) P. 2″–1″	Melampus 2 s.	Steel	3400	9000	300 0	43 0	16 6	Barrow	Barrow	1890	Total. 171,635		2 6-in., 6 4·7 in. Q.F., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	20·0	400	8000
Sloop	Melita	*Comp.*	970	1200	167 0	32 0	13 6	Malta	Malta Dock Yard	1888	Total. 60,179		8 5-in., 8 M., 1 l.	..	12·50	150	2100
Cruiser (3rd class). P. 1½″	Melpomene 2 s.	Steel cop. shd.	2950	9000	265 0	41 0	17 6	Portsm'th	Palmer Co.	1888	x92,000	y50,000	6 6-in., 9 6-pdr. Q.F., 1 3-pdr. do., 3 M., 1 l.	2 f. tu. 2 l. car.	19·0	400	8000
Cruiser (2nd class)	Mercury 2 s.	Steel	3730	6000	300 0	46 0	22 0	Pembroke	Maudslay	1878	119,452	93,800	13 5-in., 4 3-pdr. Q.F., 9 M., 1 l.	4 l. car.	16·8	780	4950
Cruiser (2nd class) P. 3″–2″	Mersey 2 s.	Steel	4050	6000	300 0	46 0	19 6	Chatham	Humphrys	1885	100,000	54,000	2 15-ton, 10 6-in., 3 6-pr. Q.F., 8 3-pdr. do., 5 M. 2 l.	2 tu. sub 2 l. car.	17·3	900	8750
Cruiser (3rd class) P. 2″–1″	Mildura 2 s. (Special for Australia)	Steel	2575	7500	265 0	41 0	15 6	Elswick	Hawthorn	1889	Total. 116,062		8 4·7-in. Q.F., 8 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·0	300	4800

Cruiser (2nd class)	P. 2½"	Minerva .	2 s.	Steel cop. shd.	5600	9600	350	0 53	0 20	6	Chatham.	Chatham .	Bldg.	Total. 277,801		5 6-in. Q.F., 6 4·7-in. do., 8 12-pr. do., 1 3-pr. do., 4 M., 1 l.	3 f. tu. (2 sub.)	19·5	550	..
Gun Boat (2nd class)	. .	Misletoe . (Harbour Service)		Comp.	560	500	135	0 26	0 13	4	Birkenh'd	Laird .	1883	18,000	8,500	2 5-in., 2 4-in., 2 M., 2 l.	..	10·7	95	..
Cruiser (3rd class)	.	Mohawk .	2 s.	Steel	1770	3500	225	0 36	0 14	6	Glasgow .	Thomson .	1886	x55,916	y31,667	6 6-in., 8 3-pdr. Q.F., 2 M., 1 l.	1 f. tu. 2 l. car.	16·5	475	7000
Sloop .	. .	Mutine .	.	Comp.	1130	800	170	0 36	0 15	9	Devonp'rt	Maudslay .	1880	37,500	11,770	10 5-in., 8 M., 1 l.	..	12·10	150	1480
Cruiser (2nd class)	P. 2"–1"	Naiad .	2 s	Steel	3400	9000	300	0 43	0 16	6	Barrow .	Barrow .	1890	Total. 171,445		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	20·0	400	8000
(Cruisers (1st class)	P.	4 New Ships	2 s.—Improved Blenheims, one at Pembroke, three by Contract. Design not yet settled.																	
Cruiser (2nd class)	. P.	4 New Ships .	.	..	5750	10,000	320	0 57	0	..	Devonp'rt	..	Pro.	..	..	Nearly as Talbot.	..	18½ to 19	..	..
Cruiser (3rd class)	. .	2 New Ships .	.	..	2100	7000	300	0 36	6	..	Sheerness	..	Pro.	..	..	8 4-in. Q.F., 8 3-pr. do., and other smaller guns.	..	20·0	..	..
1st Class or Torpedo Gun Boat		Niger .	2 s.	Steel	810	3784	230	0 27	0 8	9	Barrow .	Barrow .	1892	Total. 48,177		2 4·7-in. Q.F., 4 3-pdr. do. .	3 tu. (2 rev.)	19·3 (t)	100	2500
Sloop .	. .	Nymphe .	.	Comp.	1140	2000	195	0 28	0 12	6	Portsm'th	Greenock F'ndry Co.	1888	x42,400	y15,200	8 5-in., 8 M.	..	14·0	160	3000
1st Class or Torpedo Gun Boat		Onyx .	2 s.	Steel	810	3548	230	0 27	0 8	9	Birkenh'd	Laird .	1892	Total. 53,961		2 4·7-in. Q.F., 4 3-pdr. do. .	3 tu. (2 rev.)	19·25 19·0 (t)	100	2500
Cruiser (3rd class)	. P. 2"–1"	Pallas .	2 s.	Steel	2575	7610	265	0 41	0 15	6	Portsm'th	Hawthorn.	1890	Total. 148,828		8 4·7-in. Q.F., 8 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·0	300	4800
Gun Boat (1st class)	. .	Partridge	.	Comp.	755	1200	165	0 30	0 11	4	Devonp'rt	Devonport	1888	27,800	10,000	6 4-in., 4 M.	..	13·2	105	2500
" " .	.	Peacock .	.	Comp.	755	1200	165	0 30	0 11	4	Pembroke	Barrow Co.	1888	27,600	10,000	6 4-in., 4 M.	..	13·25	105	2500
Cruiser (3rd class)	. P. 2"–1"	Pearl .	2s.	Steel	2575	7500	265	0 41	0 15	6	Pembroke	Earle .	1890	Total. 151,693		8 4·7-in. Q.F., 8 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·0	300	4800

(t) On steam trial. x Includes Gun Mountings, &c. y Propelling Machinery.

GREAT BRITAIN.—Unarmoured Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Launch.	Cost. Hull.	Cost. Machinery.	Armament. Guns.	Armament. Fish Torpedo Dischargers	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
			tons.		ft. in.	ft. in.	ft. in.				£	£			knots.	tons.	knots.
Sloop . .	Pelican . .	*Comp.*	1130	800	170 0	36 0	15 3	Devonp'rt	Humphrys.	1877	41,282	14,939	2 6-in., 6 5-in., 4 M., 1 l.	..	10·6	130	1480
" . .	Penguin . . (Surveying service)	*Comp.*	1130	700	170 0	36 0	16 1	Glasgow .	Hawthorn.	1876	39,611	12,500	2 64-pdr. M.L.R., 2 M., 1 l.	..	11·0	150	1500
Cruiser (2nd class) . pp. 1½"	Phaeton . 2 s.	Steel	4300	5000	300 0	46 0	20 6	Glasgow .	Napier .	1883	86,763	58,435	10 6-in., 4 3-pdr. Q.F., 11 M., 2 l.	4 l. car.	16·6	1000	11,000
Gun Boat (1st class) . .	Pheasant .	*Comp.*	755	1200	165 0	29 0	11 4	Devonp'rt	Devonport	1888	x27,800	y10,000	6 4-in., 4 M.	..	13·25	105	2500
Cruiser (3rd class) . P. 2"–1"	Philomel. 2 s.	Steel	2575	7500	265 0	41 0	15 6	Devonp'rt	Earle .	1890	Total. 156,102		8 4·7-in. Q.F., 8 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·0	300	4800
" " P. 2"–1"	Phœbe . 2 s.	Steel	2575	7500	265 0	41 0	15 6	Devonp'rt	Devonport	1890	Total. 161,154		8 4·7-in. Q.F., 8 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·0	300	4800
Sloop . .	Phœnix . 2 s.	Steel cop. shd.	1050	1400	185 0	32 6	11 3	Devonp'rt	Devonport	Bldg.	Tot l. 61,773		6 4-in. Q.F., 4 3-pdr. do., 3 M.	..	13·0	160	..
Gun Boat (1st class) . .	Pigeon . .	*Comp.*	755	1200	165 0	30 0	11 4	Pembroke	Barrow .	1888	x27,800	y10,000	6 4-in., 4 M. . . .	..	13·25	105	2500
" " . .	Pigmy . .	*Comp.*	755	1200	165 0	30 0	11 4	Sheerness	Barrow .	1888	28,000	9,700	6 4-in., 4 M. . . .	..	13·2	105	2500
Cruiser (2nd class) . P. 2"–1"	Pique . 2 s.	Steel cop. shd.	3600	9000	300 0	43 8	17 6	Jarrow .	Palmer .	1890	Total. 184,108		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·75	400	8000
Gun Boat (1st class) . .	Plover . .	*Comp.*	755	1200	165 0	30 0	11 4	Pembroke	Barrow .	1888	28,000	9,700	6 4-in., 4 M. . .	..	13·2	105	2500
Torpedo Ram P. 3"–2"	Polyphemus 2 s.	Steel	2640	5500	240 0	40 0	20 0	Chatham.	Humphrys.	1881	114,000	60,450	6 6-pdr. Q.F., 2 M. . .	5 f. tu. subm.	18·0	300	3400
Cruiser (3rd class) . .	Porpoise 2 s.	Steel	1770	3500	225 0	36 0	14 6	Glasgow .	Thomson .	1886	x55,916	y31,667	6 6-in., 8 3-pdr. Q.F., 2 M., 1 l.	1 f. tu. 2 l. car.	16·5	475	7000

Cruiser (1st class)	P.	Powerful	2 s.	Steel cop. shd.	14,200	25,000	500	0	71	0	27	0	Barrow	Barrow	Bldg	Total. 655,375		2 9·2-in., 12 6-in. Q.F., 16 12-pr. do., 12 3-pdr. do., 9 M., 2 l.	4 f. tu. (sub.)	22·0	3000 2600	25,000
Cruiser (3rd class)	pp. 1¼″	Pylades		Comp.	1420	1400	200	0	38	0	15	9	Sheerness	Laird	1884	45,500	16,500	14 5-in., 8 M., 1 l.	..	12·6	400	6400
Sloop		Racer		Comp.	970	850	167	0	32	0	14	0	Devonp'rt	Hawthorn	1884	37,000	12,000	8 5-in., 8 M., 1 l.	..	11·0	150	2300
Cruiser (3rd class)		Racoon	2 s.	Steel	1770	4500	225	0	36	0	13	6	Devonp'rt	Harland	1887	x60,606	y31,000	6 6-in., 8 3-pdr. Q.F., 2 M., 1 l.	1 f. tu. 2 l. car.	17·5	475	7000
Cruiser (2nd class)	P. 2″–1″	Rainbow	2 s.	Steel cop. shd.	3600	9681	300	0	43	8	17	6	Jarrow	Palmer	1891	Total. 184,086		2 6-in. Q.F., 6 4·7-in. do., 8 6-pr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·7	400	8000
" "		Raleigh		Iron cop. shd.	5200	4200	298	0	49	0	24	7	Chatham	Humphrys	1873	147,248	46,138	8 90-cwt. M.L.R., 8 6-in., 8 5-in., 12 M., 4 l.	2 l. car.	13·9	550	2100
Gun Vessel (2nd class)		Rambler (Surveying service)		Comp.	835	650	157	0	29	6	13	7	Glasgow	Elder	1880	26,625	10,413	2 20-pdr., 1 M., 1 l.	..	10·66	40	1050
Cruiser (3rd class)	pp. 1¼″	Rapid		Comp.	1420	1400	200	0	38	0	15	9	Devonp'rt	Maudslay	1883	52,107	16,119	2 6-in., 10 5-in., 4 M., 1 l.	..	12·6	400	6000
Gun Boat (1st class)		Rattler		Comp.	715	1200	165	0	29	0	11	0	Elswick	Hawthorn	1886	x28,134	y10,600	6 4-in., 4 M.	..	13·6	105	2500
1st Class or Torpedo Gun Boat		Rattlesnake	2 s.	Steel	550	2700	200	0	23	0	8	0	Birkenh'd	Laird	1886	x21,425	y14,000	1 4-in., 6 3-pdr. Q.F.	2 f. tu. 2 l. car.	18·5	100	3050
Gun Boat (2nd class)		Raven		Comp.	465	360	125	0	23	6	10	0	Poplar	Rennie	1882	14,800	6,250	2 64-pdr. M.L.R., 2 20-pdr., 2 M.	..	9·5	40	..
Gun Boat (1st class)		Redbreast		Comp.	805	1200	165	0	31	0	11	7½	Pembroke	Earle	1888	29,400	9,300	6 4-in., 4 M.	..	13·0	105	2500
" "		Redpole		Comp.	805	1200	165	0	31	0	11	7½	Pembroke	Earle	1888	29,400	9,300	6 4-in., 4 M.	..	13·7	105	2500
Gun Boat (2nd class)		Redwing		Comp.	461	360	125	0	23	6	10	0	Pembroke	Maudslay	1880	16,400	5,800	2 20-cwt., 2 M.	..	9·68	40	..
Sloop		Reindeer		Comp.	970	850	167	0	32	0	14	0	Devonp'rt	Hawthorn	1883	34,834	52,787	6 5-in., 8 M., 1 l.	..	11·5	150	3200
1st Class or Torpedo Gun Boat		Renard	2 s.	Steel	810	3500 3962 (t)	230	0	27	0	8	9	Birkenh'd	Laird	1892	Total. 53,848		2 4·7 in. Q.F., 4 3-pdr. do.	3 tu. (2 rev.)	19·25 19·4 (t)	100	2500

(t) On steam trials. x Includes Gun Mountings &c. y Propelling Machinery.

GREAT BRITAIN.—Unarmoured Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Launch.	Cost. Hull.	Cost. Machinery.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
			tons.		ft. in.	ft. in.	ft. in				£	£			knots.	tons.	knots.
Cruiser (2nd class) . P. 2″–1″	Retribution 2 *s.*	Steel cop. shd.	3600	9000	300 0	43 8	17 6	Jarrow .	Palmer .	1891	Total. 183,975		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·75	400	8000
Cruiser (3rd class) . P. 2″–1″	Ringarooma 2 *s.* (Special for Australia)	Steel	2575	7500	265 0	41 0	15 6	Glasgow .	Thomson .	1890	Total. 128,076		8 4·7-in. Q.F., 8 3-pdr. Q.F., 4 M., 1 l.	2 f. tu. 2 l. car.	19·0	300	4800 ..
Gun Boat (1st class) . .	Ringdove .	*Comp.*	805	1200	165 0	31 5	11 7½	Devonp'rt	Devonport	1889	Total. 39,753		6 4-in., 2 3-pdr. Q.F., 2 M.	..	13·0	105	2500
Cruiser (1st class) . P. 5″–1″	Royal Arthur 2 *s.*	Steel cop. shd.	7700	12,000	360 0	60 0	23 9	Portsm'th	Maudslay .	1891	Total. 402,414		1 22-ton B.L.R., 12 6-in. Q.F., 12 6-pdr. do., 5 3-pdr. do., 7 M., 2 l.	4 tu. (2 sub. 2 tr.)	19·7	850	10,000
Cruiser (3rd class) . pp. 1¼″	Royalist . .	*Comp.*	1420	1400	200 0	38 0	15 9	Devonp'rt	Maudslay .	1883	52,134	16,039	2 6-in., 10 5-in., 4 M., 1 l.	..	12·6	400	6000
” ” .	Ruby . .	*Comp.*	2120	1800	220 0	40 0	18 8	Hull .	Earle .	1876	66,113	27,003	12 64-pdr. M.L.R., 6 M., 1 l. .	..	12·28	260	2080
Cruiser (1st class) . P. 5″–1″	St. George 2 *s.*	Steel cop. shd.	7700	12,000 10,536 (*t*)	360 0	60 8	23 9	Hull . .	Maudslay .	1892	Total. 377,204		2 22-ton, 10 6-in. Q.F., 12 6-pdr. do., 5 3-pdr. do., 7 M., 2 l.	4 tu. (2 sub. 2 tr.)	19·7	850	10,000
1st Class or Torpedo Gun Boat .	Salamander 2 *s.*	Steel	735	3500	230 0	27 0	8 3	Chatham .	Maudslay .	1889	Total. 57,911		2 4·7-in. Q.F., 4 3-pdr. Q.F. .	1 f. tu 2 l. car.	20·0	100	2500
” ” .	Sandfly 2 *s.*	Steel	525	2700	200 0	23 0	8 9	Devonp'rt	Maudslay	1887	*x*22,877	*y*13,290	1 4-in., 6 3-pdr. Q.F. .	2 f. tu. 2 l. car.	19·0	80	2400
Cruiser (2nd class) . P. 2″–1″	Sappho . .	Steel	3400	(*t*) 9861	300 0	43 0	16 6	Poplar .	Penn .	1891	Total. 171,853		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	(*t*) 20·47	400	8000

Cruiser (3rd class) . pp. 1¼"	Satellite . .		*Comp.*	1420	1400	200 0	38 0	15 9	Sheerness	Humphrys .	1881	47,500	15,400	2 6-in., 6 5-in., 4 M., 1 l. .	..	12·6	400	6000
" " .	Scout .	2 s.	Steel	1580	3200	220 0	34 0	14 6	Glasgow .	Thomson .	1885	x63,916	y23,600	4 5-in., 8 3-pdr. Q.F., 2 M., 1 l.	3 f. tu. (1 sub.) 4 l. car.	16 7 (t)	450	6900
Cruiser (2nd class) . P. 2"–1"	Scylla .	2 s.	Steel	3400	9280	300 0	43 0	16 6	Poplar .	Penn .	1892	171,593		2 6-in. Q.F., 6 4·7-in. do, 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	20·62	400	8000
1st Class or Torpedo Gun Boat .	Seagull .	2 s.	Steel	735	3500	230 0	27 0	8 3	Chatham .	Maudslay .	1889	Total. 56,922		2 4·7-in., 4 3-pdr. Q.F. . .	1 f. tu. 2 l. car.	20·0	100	2500
Cruiser (2nd class) . P. 3"–2"	Severn .	2 s.	Steel	4050	6000	300 0	46 0	19 6	Chatham .	Humphrys.	1885	x 151,681	y 60,940	2 15-ton, 10 6-in., 3 6-pdr. Q.F., 2 3-pdr. do., 10 M., 2 l.	1 tu. sub 2 l. car.	17·3	900	8750
1st Class or Torpedo Gun Boat	Sharpshooter	2 s.	Steel	735	3500	230 0	27 0	8 3	Devonp'rt	Bellis .	1888	x 29,675	y 20,354	2 4·7-in. Q.F., 4 3-pdr. do. .	1 f. tu. 2 l. car.	20·0	100	2500
" " .	Sheldrake	2 s.	Steel	735	3500	230 0	27 0	8 3	Chatham .	Maudslay .	1889	Total. 57,800		2 4·7-in. Q.F., 4 3-pdr. do. .	1 f. tu. 2 l. car.	20·0	100	2500
Cruiser (2nd class) , P. 2"–1"	Sirius .	2 s.	Steel cop. shd.	3600	9000	300 0	43 8	17 6	Elswick .	Maudslay .	1890	Total. 186,649		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·75	400	8000
1st Class or Torpedo Gun Boat	Skipjack.	2 s.	Steel	735	3500	230 0	27 0	8 3	Chatham	Laird .	1889	Total 59,531		2 4·7-in. Q.F., 4 3-pdr. do. .	1 f. tu. 2 l. car.	20·0	100	2500
" " .	Spanker .	2 s.	Steel	735	3500	230 0	27 0	8 3	Devonp'rt	Bellis .	1889	Total. 50,000		2 4·7-in. Q.F., 4 3-pdr. do. .	1 f. tu. 2 l. car.	20·0	100	2500
Gun Boat (1st class) . .	Sparrow . .		*Comp.*	805	1200	165 0	31 0	11 7½	Greenock	Greenock	1889	Total. 39,000		6 4-in, 2 3-pdr. Q.F., 2 M.	..	13·0	105	2500
Cruiser (2nd class) . P. 2"–1"	Spartan .	2 s.	Steel cop. shd.	3600	9000	300 0	43 8	17 6	Elswick .	Maudslay .	1891	Total. 186,351		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19·75 20·44 (t)	400	8000
1st Class or Torpedo Gun Boat	Speedwell	2 s.	Steel	735	3500	230 0	27 0	8 3	Devonp'rt	Laird .	1889	Total. 52,000		2 4·7-in. Q.F., 4 3-pdr. do. .	1 f. tu. 2 l. car.	20·0	100	2500
" " .	Speedy .	2 s.	Steel	810	(t) 4703	230 0	27 0	8 9 / 9 7 (t)	Chiswick	Thornycr't	1893	Total. 58,927		2 4·7-in. Q.F., 4 3-pdr. do. .	3 tu. (2 rev.)	20·21	100	..

(t) Trials. x Includes Gun Mountings, &c. y Propelling Machinery.

GREAT BRITAIN.—Unarmoured Cruising Ships, &c.—*continued.*

Class.	NAME.	Material of Hull.	Displacement.	Indicated Horse-Power.	Length.	Beam.	Draught of Water.	Where Built.	Maker of Engines.	Date of Launch.	Cost. Hull.	Cost. Machinery.	Armament. Guns.	Armament. Fish Torpedo Dischargers	Speed.	Coal Endurance. Coal that can be carried in Bunkers.	Coal Endurance. Distance that can be steamed at 10 knots speed.
			tons.		ft. in.	ft. in.	ft. in.				£	£			knots.	tons.	knots.
1st Class or Torpedo Gun Boat	Spider . 2 s.	Steel	525	2700	200 0	23 0	8 9	Devonp'rt	Maudslay	1887	x23,000	y13,300	1 4-in., 6 3-pdr. Q.F. . .	2 f. tu. 2 l. car.	19·0	80	2400
Gun Boat . . (2nd class)	Starling . .	*Comp.*	465	360	125 0	23 6	10 0	Poplar .	Rennie .	1882	14,850	6,250	2 64-pdr. M.L.R., 2 20-pdr., 2 M.	..	9·5	40	..
" " .	Stork (Surveying Vessel)	*Comp.*	465	360	125 0	23 6	10 0	Poplar .	Rennie .	1882	14,900	6,250	1 M., 2 l.	..	9·5	40	..
Despatch Vessel .	Surprise 2 s.	Steel	1650	3000	250 0	32 6	14 0	Jarrow .	Palmer .	1885	x49,084	y29,680	4 5-in., 4 6-pdr. Q.F., 2 M. .	..	17·0	400	6450
Sloop . . .	Swallow . 2 s.	*Comp.*	1130	1570	195 0	28 0	11 6	Sheerness	Rennie .	1885	44,797	15,000	8 5-in., 8 M. . . .	..	13·5	280	5000
Gun Vessel. . (2nd class)	Swift . 2 s.	*Comp.*	756	870	165 0	29 0	10 11	Blackwall	Rennie .	1879	24,290	10,380	2 90-cwt. M.L.R., 4 6-pdr. Q.F., 2 M.	..	11·81	180	2400
Cruiser . P. (2nd class) 2″–1″	Sybille . 2 s.	Steel	3400	9496	300 0	42 0	16 6	Stephenson.	Hawthorn.	1890	Total. 174,670		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	20·0	400	8000
Cruiser . P. (2nd class) 2½″	Talbot . 2 s.	Steel cop. shd.	5600	9600	350 0	53 6	20 6	Devonp'rt	Devonport	Bldg.	Total. 287,959		5 6-in. Q.F., 6 4·7-in. do., 8 12-pdr. do., 1 3-pdr. do., 4 M., 1 l.	3 f. tu. (2 sub.)	19·5	550	..
Cruiser . . (3rd class)	Tartar . 2 s.	Steel	1770	3500	225 0	36 0	14 3½	Glasgow .	Thomson .	1886	x55,916	y31,667	6 6-in., 8 3-pdr. Q.F., 2 M., 1 l.	1 f. tu. 2 l. car.	16·5	325	4850
" " P. 2″–1″	Tauranga 2 s. (Special for Australia)	Steel	2575	7500	265 0	41 0	15 6	Glasgow .	Thomson .	1889	Total. 128,101		8 4·7-in. Q.F., 8 3-pdr. Q.F., 4 M., 1 l.	2 f. tu. 2 l. car.	19·0	300	4800
Cruiser . P. (2nd class) 2″–1″	Terpsichore 2 s.	Steel	3400	9000	300 0	43 0	16 6	Glasgow .	Thomson .	1890	Total. 173,341		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do.	2 f. tu. 2 l. car.	20·0	400	8000
Cruiser . P. (1st class)	Terrible . .	Steel cop. shd.	14,200	25,000	500 0	71 0	27 0	Glasgow .	Thomson .	Bldg.	Total. 662,851		2 9·2-in., 12 6-in. Q.F., 16 12-pdr. do., 12 3-pdr. do., 9 M., 2 l.	4 f. tu. (sub.)	22·0	2600	25,000

Cruiser (2nd class)	P. 3″–2″	Thames .	2 s.	Steel	4050	5700	300	0	46	0	19	6	Pembroke	Penn .	1885	151,952	53,500	2 15-ton, 10 6-in., 3 6-pdr. Q.F., 8 3-pdr. do., 6 M., 2 l.	2 l. car.	16·8	900	8750
Cruiser (1st class)	. P. 5″–1″	Theseus .	2 s.	Steel	7350	12,000 10,608 (*t*)	360	0	60	0	23	9	Blackwall	Maudslay .	1892	Total. 347,577		2 22-ton, 10 6-in. Q.F., 12 6-pdr., and 5 3-pdr. do., 7 M., 2 l.	4 tu. (2 sub. 2 tr.)	20·0	850	10,000
Cruiser (2nd class)	. P. 2″–1″	Thetis .	2 s.	Steel	3400	9000	300	0	43	0	16	6	Glasgow .	Thomson .	1890	Total. 173,146		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	20·0	400	8000
Gun Boat (1st class)	.	Thrush .	.	*Comp.*	805	1200	165	0	31	0	11	7½	Greenock	Greenock F'ndry Co.	1889	Total. 39,000		6 4-in., 2 3-pdr. Q.F., 2 M.	..	13 0	105	2500
Sloop .	.	Torch .	.	Steel cop. shd.	960	1400	180	0	32	6	11	6	Sheerness	Sheerness .	1894	Total. 61,718		6 4-in. 25-pdr. Q.F., 4 3-pdr. do., 2 M.	..	13·25	130	..
Cruiser (3rd class)	.	Tourmaline .		*Comp.*	2120	1800	220	0	40	0	18	8	Midd'l'sbro	Hawthorn.	1875	69,99	25,771	4 6-in., 8 5-in. 38-cwt., 8 M., 2 l.	..	12·2	280	2000
Cruiser (2nd class)	. P. 2″–1″	Tribune .	2 s.	Steel	3400	9000	300	0	43	0	16	6	Glasgow .	Thomson .	1891	Total. 173,006		2 6-in. Q.F., 6 4·7-in. do., 8 6-pdr. do., 1 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	20·0	400	8000
Cruiser (2nd class)	. P. 2½″	Venus .	2 s.	Steel cop. shd.	5600	9600	350	0	53	0	20	0	Glasgow .	Elder .	Bldg.	Total. 250,424		5 6-in. Q.F., 6 4·7-in. do., 8 12-pdr. do., 7 3-pdr. do., 4 M., 1 l.	3 f. tu. (2 sub).	19·5	550	..
Torpedo Vessel .		Vesuvius	2 s.	Iron	245	350	90	0	22	0	8	6	Pembroke	Maudslay .	1874	10,522	7,465	Nil	4 tu.	9·71	25	..
Cruiser (2nd class)	.	Volage .	.	Iron cop. shd.	3080	2400	270	0	42	0	22	0	Blackwall	Ravenhill .	1874	91,817	41,000	10 6-in., 2 64-pdr. M.L.R., 10 M., 2 l.	2 l. car.	12·8	420	1850
Torpedo Ship .	Depôt . P. 5″–2½″	Vulcan .	2 s.	Steel	6620	12,032	350	0	58	0	23	0	Portsm'th	Humphrys	1889	Total. 370,447		8 4·7-in. Q.F., 12 3-pr. do., 16 M., 1 l.	4 f. tu. (2 sub.) 2 l. car.	20·0	1000	12,000
Cruiser (3rd class)	. P. 2″–1″	Wallaroo (Special for Australia)	2 s	Steel	2575	7500	265	0	41	0	15	6	Elswick	Hawthorn.	1889	Total. 115,995		8 4·7-in. Q.F., 8 3-pdr. do., 4 M., 1 l.	2 f. tu. 2 l. car.	19 0	300	4800
Gun Boat (1st class)	.	Widgeon	2 s.	*Comp.*	805	1200	165	0	30	0	11	7½	Pembroke	Rennie .	1889	Total. 39,315		6 4-in., 2 3-pdr. Q.F., 2 M.	..	13·0	105	2500
Sloop .	.	Wild Swan	.	*Comp.*	1130	800	170	0	36	0	15	10	Glasgow .	Hawthorn.	1876	39,643	11,853	2 6-in., 6 5-in., 2 3-pr. Q.F., 2 M., 1 l.	..	11·35	150	1120
Gun Boat (2nd class)	.	Wrangler	.	*Comp.*	465	360	125	0	23	6	10	6	Barrow .	Barrow .	1880	17,267	5,460	2 64-pdr. M.L.R., 2 20-pdr., 2 M.	..	9·88	40	..

(*t*) On steam trials. *x* Includes Gun Mountings, &c. *y* Propelling Machinery.

Paddle Wheel Vessels.—Adventure, Alecto, Cockatrice, Dove, Herald, Mosquito, Pioneer, Research (surveying vessel), Sphinx, Triton (surveying vessel).
Twin Screw Gun Boats (Iron).—Dee, Don, Esk, Medina, Medway, Sabrina, Slaney, Spey, Tay, Tees, Trent, Tweed, 373 tons; 320 to 410 I.H.P.
Twin Screw Iron or Steel Gun Boats (Staunch Type).—Ant, Arrow, Badger, Blazer, Bloodhound, Bonnetta, Bouncer, Bulldog, Bustard, Comet, Cuckoo, Fidget, Gadfly, Griper, Hyena, Insolent, Kite, Mastiff, Pickle, Pike, Pincher, Plucky, Scourge, Snake, Snap, Staunch, Tickler, Weasel, 180 to 254 tons; 130 to 270 I.H.P.

Royal Naval Reserved Merchant Cruisers.

	Name.		Owners.	Length.	Breadth.	Maximum Draught of Water for the Admiralty List.	Gross Tonnage.	Indicated Horse-Power.	Ocean Speed.
				Feet.	Feet.	Feet.	Tons.		Knots.
Ships in receipt of an Annual subvention and permitted to fly the blue ensign.	Etruria		Cunard Company	501½	57	26	8,120	14,500	19½
	Umbria		" "	501½	57	26	8,128	14,500	19½
	Himalaya		Peninsular and Oriental Co.	465½	52	22½	6,898	10,000	17
	Australia		" " "	465½	52	22½	6,901	10,000	17
	Victoria		" " "	466	52	22½	6,091	7,000	16
	Arcadia		" " "	466	52	22½	6,188	7,000	16
	Majestic	2 s.	White Star Company	565	58	24½	9,965	16,000	20
	Teutonic	2 s.	" "	565	58	24½	9,984	16,000	20
	Empress of India	2 s.	Canadian Pacific Railway Co.	440	51	24½	5,905	10,000	16
	Empress of China	2 s.	" " "	440	51	24½	5,905	10,000	16
	Empress of Japan	2 s.	" " "	440	51	24½	5,905	10,000	16
Ships held at the disposition of the Admiralty without subsidy.	Servia		Cunard Company	515	52	26	7,392	10,000	16½
	Gallia		" "	430	44½	24	4,809	5,300	15½
	Britannic		White Star Company	455	45	25	5,004	5,200	16
	Germanic		" "	455	45	25	5,008	5,200	16
	Adriatic		" "	437	40½	23	3,888	3,600	15
	Britannia		Peninsular and Oriental Co.	466	52	22½	6,061	7,000	16
	Oceana		" " "	466	52	22½	6,188	6,000	16
	Peninsular		" " "	410½	48	..	5,000	4,972	15
	Oriental		" " "	410½	48	..	5,000	4,972	15
	Valetta		" " "	420½	45	22½	4,904	5,000	15
	Massilia		" " "	420½	45	22½	4,902	5,000	15
	Rome		" " "	430	44½	22½	5,545	5,500	15
	Carthage		" " "	430	44½	22½	4,879	5,000	15
	Ballarat		" " "	420	43	22½	4,748	4,500	14
	Parramatta		" " "	420	43	22½	4,756	4,500	14

There are also numerous ships on the Admiralty List complying with Admiralty conditions as to subdivision which have no national tie. They are suitable for receiving an armament, but there is no arrangement with Owners, except the promise of preference for occasional State employment.

GREATER BRITAIN.—Unarmoured Ships.

To what Government belonging.	Class of Ship.	Name.	Material of Construction.	Propellers.	Where Built.	When Launched.	Length.	Breadth.	Draught of Water.	Displacement.	Indicated Horse-Power.	Speed.	Coal Stowage.	Armament.
							ft. in.	ft. in.	ft. in.				tons.	
INDIA	1st class or Torpedo Gunboat	Assaye .	Steel	2	Elswick	1891	230 0	27 0	8 3	735	3,500	19·0	100	2 4·7-in. Q.F., 4 3-pr. do., 1 f. tu. & 2 l. car.
INDIA	Despatch Vessel	Lawrence .	Steel	Pad.	B'kenh'd	1886	212 2	32 2	18 3	1,154	1,277	13·5	270	Four 4-inch B.L.R., 4 6-pr. Q.F., 4 M.
INDIA	1st class or Torpedo Gunboat	Plassy .	Steel	2	Elswick	1890	230 0	27 0	8 3	735	3,500	19·0	100	2 4·7-in. Q.F., 4 3-pr. do., 1 f. tu. & 2 l. car.
VICTORIA.	Gunboat	Albert .	Steel	2	..	1883	115 0	25 0	10 0	350	400	10·0	..	One 8-in. 12-ton; 1 6-in. 4-ton; 2 9-pr.; 2 1-in. Nordenfelts.
VICTORIA.	Gunboat	Victoria .	Steel	2	..	1883	140 0	27 0	11 0	530	800	12·0	..	One 8-in. 12-ton; 1 6-in.; 2 12½-pr.; 2 1-in. Nordenfelts.
QUE'NSLAND.	Gun-vessel	Gayundah	Steel	2	Glasgow	1884	115 0	25 0	10 0	450	400	10·0	..	One 8-in. 11½-ton; one 6-in. 4-ton; one 3-pr. Q.F.; 2 M.
QUE'NSLAND.	Gun-vessel	Paluma .	Steel	2	Glasgow	1884	115 0	25 0	10 0	450	340	10·0	..	One 8-in. 11½-ton; one 6-in. 4-ton; one 3-pr. Q.F.; 2 M.
SOUTH AUSTRALIA	Cruiser	Protector .	Steel	2	..	1884	188 0	30 0	12 6	920	1,640	14·0	..	One 8-in. 11½-ton; five 6-in. 4-ton; five Gatlings.

Victoria has also four Iron Gunboats (Batman, Fawkner, Gannet, Lady Loch) of 336 to 387 tons displacement, and 350 to 500 Ind. H.P., and each armed with one 6-in. 4-ton gun and two machine guns.

Queensland has also a Steel Gunboat, Otter, of 290 tons displacement, and 460 Ind. H.P., armed with one 64-pr. M.L.R.

(The five special second-class Cruisers, and the two Torpedo-Gunboats of the Sharpshooter class for Australia, are included in the alphabetical list of Ships of the Royal Navy, as well as the armour-clads, Abyssinia, Cerberus, and Magdala.)

ARGENTINE REPUBLIC.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Battery. or Turret.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. At ten knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.					knots.	tons.	knots.
c.b.	Almirante Brown (steel)	4200	240 0	50 0	20 6	2	4500	9 (comp.)	8 (comp.)	11 & 8 1½"	8 8-in. 11½-ton, 6 4·7-in. Q.F., 2 3-pdr. do., 6 M.	2 f. tu. or l. car	1880	..	13·75	650	4300
c.s.t.	Andes	1535	186 0	44 0	9 6	2	750	6	8	11⅞ 1"	2 11-in. 26-ton, 2 4½-in., 4 M.	..	1875	..	9·05	120	2880
c.d.s.b.	Independencia	2300	230 0	44 4	13 0	2	3000	8 (comp.)	8 (comp.)	..	2 24-c.m. (Krupp), 4 12-c.m. Q.F., 4 3-pdr. do., 4 M.	2 f. tu. or l. car	1891	..	14·4	340	4500
c.d.s.b.	Libertad	2300	230 0	44 4	13 0	2	3000	8 (comp.)	8 "	..	2 24-c.m. (Krupp), 4 12-c.m. Q.F., 4 3-pdr. do., 4 M.	2 f. tu. or l. car	1890	..	14·3	340	4500
c.d.s.t.	Plata	1535	186 0	44 0	9 6	2	750	6	8 "	11⅜ 1"	2 11-in. 26-ton, 2 4½-in. do., 4 M.	..	1874	..	9·05	120	2880

Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. At ten knots.
		tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	knots.
g.v.	Argentina	820	192 0	27 0	13 0	1	850	Steel	1 6-in., 6 7-c.m. Krupp, 4 M.	..	1883	..	12·0	220	..
to.g.b.	Espora	520	210 0	25 0	8 0	2	3250	Steel	3 14-pdr. 3-in. Q.F., 4 3-pdr. do., 2 M.	5 l. car.	1890	..	20·0	100	2,500
cr.	New Ship (*a*) P. 5'–1½"	4500	396 0	47 2	18 0	2	17,000	Steel, cop. shd.	2 8-in., 10 4·7-in. Q.F., 16 3-pdr. do., 6 1-pdr. do.	5 f. tu.	Bldg.	..	22 75	..	..
cr.	Nueve de Julio P. 4½"-1¾"	3570	354 0	44 0	19 6	2	14,350	Steel	4 6-in. Q.F., 8 4·7-in. do, 12 3-pdr. do., 12 1-pdr. do.	5 f. tu. or l. car	1892	..	22·74	770	10,000
cr.	Patagonia	1530	220 0	32 10	12 9	2	2400	Steel & wood	1 10-in., 3 6-in., 6 l., 10 M.	..	1885	..	14·0	350	..
to.g.b.	Patria	1070	250 0	31 0	10 0	2	4500	Steel	2 4·7-in. Q.F., 4 8-pdr. do., 2 3-pdr. do., 2 M.	5 l. car.	1893	..	20·75*t*	288	4,000
g.v.	Parana	550	142 8	25 0	11 9	1	475	Iron	2 6-in., 2 4½-in.	..	1874	..	11·0	..	..
cr.	25 de Mayo P. 4½"–2"	3200	325 0	43 0	16 0	2	13,800	Steel 4½"–2"	2 21-c.m., 8 12-c.m. Q.F., 12 3-pdr. do., and 12 1-pdr. do.	3 l. car.	1890	..	22·43	600	10,000
g.v.	Uruguay	550	142 8	25 0	11 9	1	475	Iron	2 6-in., 2 4½-in.	..	1874	..	11·0	..	..

4 Gunboats (Rendel type), 416 tons, 420 I.H.P.

(*a*) Of the Blanco Encalada type.

(*t*) Trial.

AUSTRIA-HUNGARY.*—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Battery or Turret.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Endurance. Coals that can be carried in Bunkers.	Coal Endurance. At 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons.	knots.
c.d.s.	A, B & C (New ships)	5550	305 0	55 9	21 0	2	8500	10¾	9	2⅜	4 24-c.m., 6 15-c.m. Q.F., 14 47-m.m. do., 1 M.	..	Bldg.	..	17·25	..	..
c.b.	Custoza . (iron)	7060	302 3	58 0	24 6	1	4440	9	7	8¼ 1½″	8 26-c.m. 22-ton Krupp, 11 Q.F., 8 l.	..	1872	414,400	14·0	584	1624
c.b.	Don Juan de Austria (iron)	3550	240 3	50 0	20 0	1	2700	8	6	9¾ 1″	8 21-c.m. 10-ton Kıupp, 11 Q.F. & M., 6 l.	..	1875	..	13·0	380	2000
c.d.s.	Erzherzog Albrecht	5940	285 2	56 3	22 0	1	3600	9	7	9½	8 24-c.m. Krupp, 11 Q.F., 8 l.	..	1872	357,600	13·0	453	1472
c.b.	Kaiser . (wood)	5810	254 0	58 3	24 3	1	3200	6	5½	31	10 9-in. 12-ton Armstrong M.L.R., 11 Q.F. & M., 8 l.	..	1871	337,200	13·0	450	1519
c.b.	Kaiser Max (iron)	3566	240 3	50 0	20 0	1	2700	8	6	9¾ 1″	8 21-c.m. 10-ton Krupp, 11 Q.F. & M., 6 l.	..	1875	211,600	13·0	380	2000
River Monitor	Körös . (steel)	448	177 0	29 6	4 0	2	1250	2	3 to 2	.. ¾	2 12-c.m. Krupp, 2 Q.F., 1 M. .	..	1892	..	10·0	..	..
b.	Kronprinz Erzherzog Rudolph (steel)	6870	295 0	62 4	25 3	2	7500	12	10	.. 2¾″	3 30½-c.m. 48-ton Krupp, 6 12-c.m. Q.F., 11 smaller do. & M., 2 l.	..	1887	330,000	16·0	600	..
b.	Kronprinzessin Erzherzogin Stefanie . (steel)	5060	278 10	55 9	21 6	2	8300	9	8	.. 1″	2 30½-c.m. 48-ton Krupp, 6 15-c.m. 5-ton do., 11 Q.F. & M., 2 l.	..	1887	300,000	17·0	400	..
River Monitor	Leitha (iron & steel)	310	166 0	27 6	3 7	2	320	1¾	2½	7½ 1″	1 12-c.m. Q.F., 2 M.	..	1871	20,000	8·0	20	..
River Monitor	Maros (iron & steel)	310	166 0	27 6	3 7	2	320	1¾	2½	7½ 1″	1 12-c.m. Q.F., 2 M.	..	1871	20,000	8·0	20	..
c.b.	Prinz Eugen (iron)	3566	240 6	50 0	20 0	1	2700	8	6	9¾ 1″	8 21-c.m. 10-ton Krupp, 11 Q.F. & M., 6 l.	..	1877	..	13·0	380	2000
River Monitor	Szamos . (steel)	448	177 0	29 6	4 0	2	1250	2	3 to 2	.. ¾	2 12-c.m. Q.F., 2 Q.F., 1 M. .	..	1892	..	10·0	..	..
c.b.	Tegetthoff (iron & steel)	7390	286 11	71 1	24 10	2	8300	14	14	9¾ 3″	6 24-c.m. Krupp, 5 15-c.m. Q.F., 15 smaller do., 2 M.	..	1878	..	15·3	670	3300

* Particulars from *Pola Almanach.*

AUSTRIA-HUNGARY.—Unarmoured Ships.

Class.	NAME.	Displacement.	Length.		Beam.		Draught of Water.		Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Discharkers	Date of Launch.	Cost.	Speed.	Coals Carried.	Distance that can be steamed at 10 knots.
		tons.	ft.	in.	ft.	in.	ft.	in.							£	knots.	tons.	knots.
cr. 3rd class	Archduke Frederic	1590	173	10	39	5	16	9	1	780	wood	10 15-c.m. Wahrendorf, 1 l.	..	1874	..	9·0	200	..
corv.	Aurora	1370	190	6	32	10	16	1	1	1000	composite	2 12-c.m. Wahrendorf, 5 l., 2 M. or Q.F.	..	1873	..	11·0	160	..
to. g. b.	Blitz	360	193	6	22	4	8	0	..	2900	steel	9 Q.F.	..	1888	..	21·0	..	..
cr. 3rd class	Donau	2343	230	0	42	8	19	8	1	1800	composite	10 12-c.m. Uchatius, 4 M., 1 l.	..	1893	..	12·0	320	..
cr. 3rd class	Fasana	2000	223	3	39	5	16	9	1	1700	wood	4 15-c.m. 5-ton Krupp, 2 Q.F., 1 l.	..	1870	..	12·0	315	..
cr.	Frundsberg	1370	190	6	32	10	16	1	1	1000	composite	2 15-c.m. 3-ton Wahrendorf, 5 l., 2 M. or Q.F.	..	1873	..	11·0	160	..
cr. 2nd class P. 2¼″	Kaiserin Elizabeth	4064	321	6	47	6	18	7	2	9000	steel	2 24-c.m. 27-ton Krupp, 6 15-cm. 6-ton do., 11 Q.F., 2 l.	5 f. tu. or l.car	1890	..	19·0	660	4500
cr. 1st class P. 2¼″	Kaiserin Maria Teresa	5270	351	0	52	6	20	0	2	10000	steel	2 24-c.m. 27-ton Krupp, 8 15-c.m. Q.F., 18 smaller Q.F., 2 l.	4 f. tu. or l.car	1893	..	20·0	660	4500
cr. 2nd class P. 2¼″	Kaiser Franz Joseph	4030	321	6	47	6	18	7	2	9000	steel	2 24-c.m. 27-ton Krupp, 6 15-cm. do., 11 Q.F., 2 l.	5 f. tu. or l.car	1889	..	19·0	660	4500
to. g. b.	Komet	360	193	6	22	4	8	0	..	2900	steel	9 Q.F.	..	1888	..	21·0	..	..
cr. 2nd class	Laudon	3430	253	0	46	0	20	8	1	2600	iron & wood	15 15-c.m. 5-ton Krupp, 7 Q.F. & M., 2 l.	..	1873	..	13·0	450	..
cr. 3rd class	Leopard	1582	224	0	34	0	14	0	2	6000	steel	2 12-c.m. Q.F., 10 Q.F. & M.	4 f. tu. or l.car	1886	200,000	18·3	250	..
Torpedo vessel	Lussin	1011	200	4	26	3	12	2	2	1830	steel	2 15-c.m. 5-ton Krupp, 7 M., 1 l.	..	1883	..	14·0	200	..
to. g. b.	Meteor	350	187	0	22	4	8	0	2	3500	steel	9 Q.F.	f. tu. or l.car	1887	..	21·0	120	..
g. b.	Nautilus	570	150	11	26	3	11	2	1	410	wood	2 15-c.m. 3-ton Wahrendorf, 1 l.	..	1873	..	9·0	60	..
cr. 3rd class	Panther	1582	224	0	34	0	14	0	2	6000	steel	2 12-c.m. Q.F., 10 Q.F. & M.	4 f tu. orl. car	1885	..	18·5	250	..
Torpedo depôt-ship	Pelikan	2470	279	0	39	4	15	6	..	4700	steel	2 15 c.m. Krupp, 8 Q.F.	4 f. tu. or l.car	1891	..	18·0	..	..
to. g. b.	Planet	500	210	0	23	0	8	3	2	3500	steel	10 Q.F.	1 l. car.	1889	..	19·6	..	..
cr. 2nd class	Radetzky	3430	253	0	46	0	20	8	1	2700	composite	15 15-c.m. 5-ton Krupp, 7 Q.F. & M., 2 l.	..	1872	..	14·0	450	..
cr. 3rd class	Saida	2500	233	4	42	8	19	1	1	1800	wood	11 15-c.m. 5-ton Uchatius, 1 l.	..	1878	..	12·0	320	..
to. g. b.	Satellit	540	220	6	26	9	9	2	2	4000	steel	9 Q.F.	..	1893	..	21·87	..	..
"	Sebenico	900	187	0	26	3	12	2	2	1380	steel	7 Q.F., 5 l.	..	1882	..	14·0	200	..
cr. 3rd class	Spalato	850	179	6	26	3	12	2	2	1200	steel	7 Q.F., 5 l.	..	1879	..	14·0	150	..
Torpedo cruiser	Tiger	1684	233	0	32	10	15	5	2	5260	steel	4 12-c.m. 2¼-ton, 10 Q.F.	1 l. car.	1887	..	18·0	300	..
to. g. b.	Trabant	530	210	0	23	0	8	3	2	3500	steel	10 Q.F.	..	1890	..	20·0	..	..
Torpedo vessel	Zara (School ship)	850	179	6	26	3	12	2	2	1200	steel	7 Q.F., 5 l.	..	1879	..	14·0	150	..
corv.	Zrinyi	1370	190	6	32	10	16	1	1	1000	composite	2 15-c.m. 3-ton Wahrendorf, 5 l., 2 M. or Q.F.	..	1871	..	11·0	160	..

Old gunboats (probably ineffective) Albatross, Hum, Kerka, Narenta, Nautilus. *Paddle-wheel vessels*, Andreas-Hofer, Fantasie, Greif, Miramar, Taurus.
Two screw gunboats, the Grille and Sansego, of about 380 tons displacement and 300 indicated horse-power.

BRAZIL.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Battery or Turret.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons.	knots.
River Monitor. (stationary)	**Alagoãs** . . (wood)	340	120 0	28 0	4 10	2	180	4½	4½	14½	1 70-pdr. Whitworth M.L.R.	..	1886	..	7·0	..	..
c.d.s., t.	**Bahia** . . (iron)	1000	178 0	35 0	8 6	2	1640	4½	5½	$10\frac{3}{5}$	2 7-in. M.L.R. (Whitworth), 2 M.	..	1865	..	6·0	..	..
River Monitor	**Maranhao** . .	..	Projected.		..	..	..	..	..	..	.. .. ..	..	..	..	..	..	..
t.	Two new ships . . .	3162	267 6	47 0	13 2	2	3400	..	..	..	4 9·4-in., 2 6-in. howitzers, 4 4·7-in. Q.F., 2 12-pr. do., 4 6-pr. do., and 2 1-pr. do.	..	Pro.	..	14·0	..	..
River Monitor	**Pernambuco** . . .	..	Projected.		..	..	..	..	..	..	.. .. ..	..	..	..	..	..	..
River Monitor (stationary)	**Piauhy** . . (wood)	340	120 0	28 0	4 10	2	180	4½	4½	14½	1 70-pdr. Whitworth M.L.R. .	..	1887	..	7·0	..	..
t.	**Riachuelo** (steel, cop. shd.)	5700	305 0	52 0	19 6	2	7300	11 comp.	11 & 10 comp.	10 2″	4 9-in. 20-ton (Whitworth, altered by Armstrong), 6 5½-inch 5-ton do., 15 M.	5 f. tu. or 1. car.	1883	365,000*	16·71	800	4,500 (at 15 knots)
River Monitor (stationary)	**Rio Grande** . (wood)	340	120 0	28 0	4 10	2	180	4½	4½	14½	1 70-pdr. Whitworth M.L.R. .	..	1888	..	7·0	..	..
t.	**24 de Maio** (was **Aqui-daban**) (steel, cop. shd.)	4950	280 0	52 0	18 0	2	6200	11 comp.	11½ & 10 comp.	10 2″	4 9-in. 20-ton (Armstrong), 4 70-pdr. 5-ton do., 2 Q.F., 13 M.	5 f. tu. or 1. car.	1885	345,000*	15·0	600	..

* Exclusive of guns and ammunition.

BRAZIL.—Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers.	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	knots.
cr. P. 1½"	Almirante Tamandare	4735	294 0	46 0	18 4	2	7500	steel (wood shd.)	10 15-c.m. Q.F., 2 12-c.m. do., 8 M.	..	Bldg.	..	17·0	750	..
to.g.b.	Aurora	480	196 0	21 0	7 9	2	2300	steel (wood shd.)	2 20-pdr. Q.F., 4 3-in. do.	3 f. tu. or 1. car	1893	..	18·0	150	..
cr. P.	Benjamin Constant	2750	236 0	46 0	18 0	1	2800	steel (cop. shd.)	4 6-in. Q.F., 8 4·7-in. do., 10 smaller do. and M.	4 f. tu. or 1. car	1892	..	14·0	260	4000
"	Guanabára	1900	200 0	41 2	16 4	1	3000	wood	9 70-pdr. Whitworth, 6 M., 2 l.	..	1877	..	13·0	..	..
"	Parnahyba	838	170 6	26 3	11 2	1	900	composite	5 4·7 Armstrong, 4 M.	..	1878	..	10·0	..	..
cr.	Primeiro de Março	726	167 3	26 3	10 6	1	750	composite	7 4½-in. Whitworth, 4 M.	..	1881	..	9·0	..	..
" P. 2"–1"	Republica	1300	210 0	35 0	13 0	2	3300	steel	6 4·7-in. Q.F., 4 6-pdr. do., 6 M.	2 f. tu. 2 l. car	1892	..	17·0	170	..
g.v.	Tiradentes	800	165 0	30 0	11 0	2	1200	steel (wood shd.)	4 4·7-in. Q.F., 3 6-pdr. do., 4 M.	2 l. car	1892	..	14·5	110	..

Double-screw Gunboats.—Guarany, Iniciadora, Taripe, 250 to 330 tons, 160 to 260 I.HP.
Four River-service Gunboats of 210 tons, 200 I.HP., and 8 knots speed.
Two Paddle River-service Gunboats.
Three powerful Cruisers have been ordered of the Elswick firm, but the details are not settled.

CHILI.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Battery, Turret or Barbette.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons.	knots.
c.b.	Almirante Cochrane (iron)	3500	210 0	45 9	19 8	2	2920	9	8	7¾ 3″	6 8-in. 14-ton Arm., 4 6-pdr. Q.F., 4 3-pdr. do., 7 M.	3 f. tu. or l. car	1874	..	13·0	500	1900
b.	Capitano Prat (steel sheathed and coppered)	6900	328 0	60 8	21 10	2	12,000	12 steel schn.	4 10½ barbette.	.. 3″	4 24-c.m. (Canet), 8 12-c.m. Q.F. (Canet), 6 57-m.m. do., 4 47-m.m. do., 10 37-m.m. do., 5 M.	4 f. tu. or l. car	1890	391,000	18·3	400 1100	..
t.	Huascar . . (iron)	1800	200 0	35 0	15 6	1	1050	4½	5½	14 1½″	2 8-in. 13-ton, 2 4·7-in. Q.F., 3 M., 4 l.	..	1865	..	12·0	250	1100

Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	knots.
corv.	Abtao (used as a transport)	1370	227 0	29 6	15 6	1	1000	composite	1 70-pr., 4 6-pdr. and 3-pdr. Q.F., 4 M.	..	1864	..	9·0	300	..
to.g.b	Almirante Condell	750	240 0	27 6	9 6	2	4500	steel	3 14-pdr. Q.F., 4 3-pdr. do., 2 M.	5 l. car	1890	..	21·0	100	2500
to.g.b.	Almirante Lynch .	750	240 0	27 6	9 6	2	4500	steel	3 14-pdr. Q.F., 4 3-pdr. do., 2 M.	5 l. car	1890	..	21·0	100	2500
cr.	Blanco Encalada P. 4–1¾	4400	370 0	46 6	18 6	2	14,500	steel C.T. 6-in.	2 8-in., 10 6-in. Q.F., 12 3-pdr. do., 12 1-pdr. do.	5 f. tu. or l. car	1893	..	22·78	900	..
cr.	Congresso . P. 4½–1¾	3500	..	..	..	..	..	..	4 15-cm. Q.F., 8 12-cm. do., 14 47-mm. do., 12 37-mm. do.	6 f. tu. or l. car	Bldg.	..	22·0	..	..
gr.	Magellanes . .	800	190 0	28 0	14 9	2	1230	composite	2 6-in., 1 7-in. M.L.R., 6 M., 2 l.	..	1874	..	11·0	300	..
"	O'Higgins . .	1470	218 6	33 4	17 4	1	1200	wood	2 70-pdr., 2 12-pdr., 4 M.	..	1866	..	10·0	200	..
"	Pilcomayo . .	790	171 0	27 4	..	1	180 (nom.)	wood	2 70-pdr. B.L.R., 2 40-pdr. do. (all Armstrong), 3 M.	..	1874	..	9·0	200	..
cr.	Presidente Errázuriz P.	2080	268 0	35 9	19 6	2	5400	steel copper sheathed	4 15-c.m. Q.F. (Canet), 2 12-c.m. do., 4 57-m.m. do., 6 M.	3 l. car	1890	..	19·0	..	4500 at 12 knots
"	Presidente Pinto P.	2080	268 0	35 9	19 6	2	5400	steel copper sheathed	4 15-c.m. Q.F. (Canet), 2 12-c.m. do., 4 57-m.m. do., 6 M.	3 l. car	1890	..	19·0	..	4500 at 12 knots

Five Gunboats of 420 tons displacement and 7 to 10 knots speed.

CHINA.—Armoured Ships.

(The Chinese Navy has been practically destroyed during the war, but for the purposes of reference the list of ships is left complete.)

See also List of Chinese Ships engaged in the battle of Hai-Yun-Tau, page 102.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Turret or Barbette.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.					knots.	tons.	
b.	Chen-Yuen‡ . (steel)	7430	308 5	59 0	20 0	2	6200	14 comp.	12 comp.	14 3″	4 30½-c.m. Krupp, 21 5-c.m., 4 6-pr. and 2 3-pr. Q.F., 2 15-c.m., 8 M., 2 l.	2 l. car.	1882	..	14·5	1000	..
b.	King-Yuen* . (steel)	2850	270 0	40 0	16 6	2	3600	9½	8 comp.	3″	2 8¼-in. 10-ton, 2 6-in., 2 4-pr. Q.F., 3 3-pr. do., 7 M.	1 f. tu. sb. 3 l. car.	1887	..	16·5	325	..
c.d.s.	Ping-Yuen . (steel)	2850	200 0	40 0	16 0	2	2400	8	5 barbette and C. T.	.. 2″	1 10·2-in. Krupp, 2 6-in. do., 8 Q.F.	4 f. tu. or l. car	1890	..	10·5	..	..
b.	Lai-Yuen . (steel)	2850	270 0	40 0	16 6	2	3600	9½	8 comp.	.. 3″	2 8¼-in. 10-ton, 2 6-in., 2 4-pr. Q.F., 3 3-pr. do., 7 M.	1 f. tu. sb. 3 l. car.	1887	..	16·5	325	..
b.	Ting-Yuen† . (steel)	7430	308 5	59 0	20 0	2	6200	14 comp.	12 comp.	14 3″	4 30½-c.m. Krupp, 2 15-c.m., 4 6-pr. & 2 3-pr. Q.F., 8 M., 2 l.	2 l. car.	1881	..	14·5	1000	..
a.g.b.	Tien-Sing . (wood)	200	105 0	20 4	7 0	2	340	1⅛	3	5	1 17-c.m. Krupp . . .	..	1875	..	10·0	..	..

Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	knots.
cr.	Chao-Yung* . pp.	1350	210 0	32 0	15 8	2	2677	steel	2 10-in. Armstrong, 4 5-in. 24-pr. Q.F., 7 M., 2 l.	3 f. tu. or l. car	1881	..	16·8	300	5380 (at 8 knots)
"	Chih-Yuen* . . P. 4″–2″	2300	250 0	38 0	15 0	2	5500	steel barb'tte 10″	3 8-in., 2 6-in. 4-ton., 8 6-pr., 2 3-pr., and 6 1-pr. Q.F., 6 M.	4 f. tu. or l. car	1886	..	18·0	450	..
"	Ching-Yuen† . P. 4″–2″	2300	250 0	38 0	15 0	2	5500	steel barb'tte 10″	3 8-in., 2 6-in. 4-ton., 8 6-pr., 2 3-pr., and 6 1-pr. Q.F., 6 M.	4 f. tu. or l. car	1886	..	18·0	450	..
"	Foo-Ching . . P. 4″–2″	2500	253 0	36 2	18 0	2	2400	steel	3 21-c.m., 7 12-c.m. Krupp . . .	..	1890	..	15·0	..	..
"	Foo-Chow . . .	1300	223 0	32 0	13 3	2	1600	steel	2 6-in. Armstrong, 4 l. . . .	..	1887	..	13·0	..	..

cr.	Foo-Sing		2200	253	0	36	2	18	1	2	2400	steel	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1 l. car.	1893	..	..	..	..
"	Hai-An		2630	300	0	42	0	21	0	1	1750	wood	2 24-c.m. Krupp, 24 12-c.m. do., 4 M.	1 l. car.	1872	..	12·0	..	..
"	Huan-Tai		1300	223	0	32	10	13	3	2	1600	steel	2 15-c.m. Krupp, 5 12-c.m. do., 4 M.	2 f. tu. or l. car	1888	..	15·0	..	..
"	Kai-Chih		2480	259	0	39	4	15	2	..	3000	steel	2 21-c.m., 6 15-c.m., 6 M., 5 l.	..	1884	..	15·0	..	..
to. cr.	Kong-Bin		1100	..		..		..		2	3400	steel	1 15-c.m., 1 12-c.m., 4 M.	..	1891	..	..	..	..
"	Kong-Hi		1100	..		..		..		2	3400	steel	1 15-c.m., 1 12-c.m., 4 M.	..	1891	..	..	..	..
cr.	Kwang Chia §	P. 1"	1296	..		..		..		2	2400	steel and wood	1 4·7-in., 1 4·7-in. Q.F., 2 4-pr. Q.F., 8 M.	..	..	..	13·8	..	..
"	Kwang King	P. 1"	1030	236	0	27	6	11	4	2	2400	steel and wood	3 12-c.m. Q.F., 8 M.	4 l. car.	1891	..	16·5	..	..
"	Kwang Ping §	P. 1"	1000	236	0	27	6	11	4	2	1200	steel and wood	1 4·7-in., 1 4·7-in. Q.F., 8 M.	4 l. car.	1890	..	9·5	..	..
"	Nan-Schuin		2200	253	0	36	2	18	1	2	2400	steel	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1 l. car.	1884	..	15·0	..	..
"	Nan-Thin		2200	253	0	36	2	18	1	1	2400	steel	2 8-in. Armstrong, 8 4·7-in. Q.F., 4 M.	1 l. car.	1883	..	15·0	..	..
g.v.	Tshen-Hai		578	160	10	26	3	10	6	1	480	wood	1 6½-ton Armstrong M.L.R., 4 5-in.	..	1872	..	10·0	..	..
cr.	Tsi-Yuen	P. 4"–2"	2355	236	3	33	0	15	9	2	2800	steel	2 21-c.m., 1 15-c.m., 2 4-pr. Q.F., 9 M.	4 f. tu. or l. car	1883	..	15·0	230	..
g.v.	Tsing-Yuen		578	160	10	26	3	10	6	1	480	wood	1 6½-ton Armstrong, M.L.R., 4 5-in.	..	1872	..	10·0	..	..
cr.	Yung-Pao		2500	253	0	36	2	18	0	2	2400	steel	3 8-in. 10-ton 7 4¾-in. Krupp	..	1883	..	15·0	..	..
"	Yung-Wei *	pp.	1350	210	0	32	0	15	8	2	2580	steel	2 10-in. Armstrong, 4 5-in., 2 4-pr. Q.F., 7 M., 2 l.	3 f. tu. or l. car	1881	..	16·0	300	5370 (at 8 knots)
to. g.b.	(X.)		450	200	0	23	0	8	3	2	2700	steel	1 4-in., 4 M.	4 l. car.	1888	..	19·0	100	..
cr.	Ye-Sing		2500	253	0	36	0	18	0	1	2400	steel	3 8-in. 10-ton, 7 4¾-in. Krupp	..	1888	..	15·0	..	..

Gunboats (Rendel's System).—Eleven of 325 to 440 tons displacement, 235 to 450 indicated horse-power, named with letters of Greek alphabet.

Gunboats (Canton Flotilla).—Thirteen of 100 to 350 tons displacement.

Floating Batteries.—Six with 3 12-ton Armstrong guns in a wooden fixed turret for river service.

* Sunk or destroyed at Yalu. † Sunk at Wei-hai-wei. ‡ Reported to have been taken to Japan. § As given by Mr. Laird Clowes; particulars doubtful.

DENMARK.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Battery or Turret.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons.	knots.
ac.	Absalon . . (iron)	527	150 0	26 0	10 2	1	500	2½	2½	6	4 8·7-c.m. Krupp, 4 M. . .	..	1862	..	10·0	65	..
c.d.s., t.	Gorm . . . (iron)	2344	231 0	40 0	14 0	2	1670	7	8 turret	10	2 18-ton Armstrong M.L.R., 3 8·7-c.m. Krupp, 4 M.	..	1870	104,000	12·25	115	..
t.	Helgoland . . (iron)	5347	257 6	59 2	18 8	2	4000	12	10	10 2″	1 30½-c.m. 36-ton Krupp, 4 26-c.m. 22-ton do., 5 12-c.m. do., 10 M.	4 f. tu. or l.car	1878	275,000	12·0	230	1070
b.	Iver Hvitfeldt . (steel)	3260	242 0	49 6	18 0	2	5100	12	8 on barbettes	.. 2″	2 26-c.m. 28-ton Krupp, 4 12-c.m. do., 12 M.	4 f. tu. or l.car	1886	200,000	15·6	250	..
c.d.s., t.	Lindormen. . (iron)	2076	216 0	39 5	13 9	2	1560	5	5 turret	9¾	2 13-ton Armstrong M.L.R., 3 8·7-c.m. Krupp, 4 M.	..	1868	93,000	12·0	120	..
c.b.	Odin . . . (iron)	3083	237 0	50 0	15 6	1	2260	8	8	10	4 18-ton Armstrong M.L.R., 4 8·7-c.m. Krupp, 7 M.	..	1872	147,000	12 4	180	560
t.	Skjold . . (steel)	2150	226 6	38 0	13 5	..	2200	9	8-4½	.. 2″	1 24-c.m., 3 12-c.m. Krupp, 4 47-m.m. Q.F., 1 M.	..	Bldg.	..	13·0	..	..
Torpedo Ship	Tordenskiold . (steel)	2400	221 6	43 3	15 6	2	2600	..	8 (steel)	.. 4″-2″	1 52-ton Krupp, 4 12-c.m. do., 8 M.	4 f. tu or l.car	1880	138,900	14·0	170	..

DENMARK.—Unarmoured Ships.

Class.	NAME.		Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Torpedoes.	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
			tons.	ft. in.	ft. in.	ft. in.							£	knots.	tons.	
g.v.	Diana		556	154 6	26 3	10 2	1	500	wood	6 87-m.m. Krupp, 2 M.	..	1863	33,000	9·0	60	..
„	Falster		356	111 0	28 10	7 6	2	510	iron	1 20-ton Armstrong M.L.R., 2 87-m.m. Krupp, 2 M.	..	1873	33,000	9·8	20	..
cr.	Fyen	P. $1\frac{3}{4}''$	2596	226 6	45 6	18 1	1	2700	steel cop. shd.	4 15-c.m. $4\frac{3}{4}$-ton Krupp, 14 15-c.m. $3\frac{1}{2}$ ton do., 8 M.	2 f. tu. or 1 car	1882	170,000	13·0	290	..
g.v.	Fylla		556	154 0	26 3	10 2	1	500	wood	6 87-m.m. Krupp, 2 M.	..	1862	33,000	9·0	60	..
cr. (3rd class)	Geiser	P. $1\frac{1}{2}''$	1280	257 6	27 6	11 4	2	3000	steel	2 4·7-in. Q.F., 4 87-m.m. do, 6 M.	4 l. car.	1892	..	17·1	..	..
cr. (3rd class)	Heimdal	P. $1\frac{1}{2}''$	1280	257 6	27 6	11 4	2	3000	steel	2 4·7-in. Q.F., 4 3-pr. do., 6 M.	4 l. car.	1894	..	17·5	..	..
cr. (3rd class)	Hekla	P. $1\frac{1}{2}''$	1280	233 0	32 10	11 2	2	3000	steel	2 6-in. Q.F., 4 57-m.m. do., 6 M.	4 l. car.	1890	..	17·0	..	..
g.v.	Ingolf		870	192 0	28 0	12 6	1	600	iron	2 15-c.m. Krupp, 4 87-m.m. do., 2 M.	..	1876	44,000	10·5	130	..
g.v.	Moen		356	111 0	28 10	7 6	1	523	iron	1 20-ton Armstrong M.L.R., 2 87-m.m. Krupp, 2 M.	..	1875	..	9·2	20	..
corv.	Saint Thomas		1572	224 0	33 0	17 0	1	1870	wood	8 12-c.m. Krupp, 6 M.	..	1871	..	13·0	190	..
cr.	Valkyrien	P. $2\frac{1}{2}''$	2900	268 0	43 6	18 0	2	5300	steel	2 21-c.m. 10-ton Krupp, 6 15-c.m. do., 4 Q.F., 10 M.	5 f. tu. or 1 car	1887	..	17·0	450	..

Gunboats.—Five in number, of 150 to 240 tons, 200 to 400 I.HP.

FRANCE.—Armoured Ships.

Class.	NAME.	Displacement.	Length at Water Line.		Beam.		Draught of Water.		Propellers.	Indicated Horse-power.	Armour.		Backing.	Armament.		Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
											Belt.	Battery or Turret.	Deck Plating.	Guns.	Fish Torpedo Dis-chargers					
		A tons.	ft.	in.	ft.	in.	ft.	in.			inches.	inches.	inches.				£	knots.	tons.	knots.
a.g.b.	Achéron . (steel)	1640	181	0	40	4	11	10	2	1700	8	8	.. 2½"	1 27-c.m. 28-ton, 3 10-c.m. Q.F., 2 47-m.m. do., 4 M.	..	1885	100,000	13·0	100	..
b.	Amiral Baudin . (iron & steel)	11,380	321	6	69	10	26	2	2	8320	21½	16½ steel	14 4"	3 37-c.m. (75 ton), 4 16-c.m. Q.F., 8 14-c.m. do., 9 47-m.m. do., 14 M.	6 f. tu.	1883	600,000	15·0	800	3000
b.	Amiral Duperré (iron & steel)	10,487	311	0	66	11	26	9	2	8120	21½	15½	14 2¼"	4 34-c.m. (48 ton), 1 16-c.m., 14 14-c.m., 11 Q.F., 18 M.	4 f. tu. or l.car	1879	570,000	14·22	850	..
a.c.	Bayard . (wood)	5986	265	9	57	2	24	11	2	4538	10	8	15 2"	4 24-c.m. 16-ton, 2 19-c.m. 8-ton, 6 14-c.m., 3-ton, 2 65-m.m., 12 M.	2 f. tu. or l.car	1880	..	14·0	500	..
c.d.s., t.	Bélier (*d*) . (wood)	3590	217	0	53	0	19	1	2	1921	8½	7	31½	2 24-c.m. 16-ton, 4 M.	2 l. car.	1870	..	12·37	250	..
c.d.s., t.	Bouledogue (*d*)(wood)	3500	217	0	53	0	18	2	2	1827	8½	7	31½	2 24-c.m. 16-ton, 4 M.	2 l. car.	1872	..	12·25	250	..
t.	Bouvet . (steel)	12,200	382	3	70	3	27	7	3	14,000	15¾ to 8	..	.. 3½"	2 30½-c.m., 2 27-c.m., 8-14 c.m. Q.F., 8 10-c.m. do., 12 47-m.m. do., 20 37-m.m.	6 f. tu. or l.car	Bldg.	979,340	17·5	800	..
t.	Bouvines . .	6610	284	0	58	8	22	0	2	8400	17¾-10	14½ Turret base, 12¼	.. 4"	2 30½-c.m., 8 10-c.m. Q.F., 4 47-m.m. do., 10 37-m.m. M.	2 f. tu. or l.car	1892	535,000	17·0	300	..
t.	Brennus (steel)	11,000	361	0	67	0	26	3	2	14,000	15¾ comp. 4¾ above	15¾ comp. & 4-in. on battery.	.. 4¾"	3 34-c.m. 58-ton, 10 16-c.m. Q.F., 4 65-m.m. do., 8 47-m.m. do., 8 M.	4 f. tu. or l.car	1891	991,767	17·5	800	..
a.c.t.	Bruix . (steel)	4750	348	0	46	0	19	2	2	8800	3¾	..	.. 2"–1½"	2 19-c.m., 6 14-c.m. Q.F., 4 65-m.m. do., 6 47-m.m. do., 6 37-m.m. M.	4 f. tu. or l.car	1894	352,592	19·0	413	..
b.	Caïman (iron and steel)	7200	278	3	59	0	24	7	2	6000	19½	17¾	12 3"	2 42-c.m. 75-ton, 4 10-c.m. Q.F., 2 47-m.m. do., 16 M.	4 l.car.	1885	..	14·5	400	..

t.	Carnot (steel)	11,988	380	0	70	6	25	11	2	15,000	17¾ 10¾	14½ 4-in. on upper works	.. 2¾"	2 30-c.m., 2 27-c.m., 8 14-c.m. Q.F., 4 65-m.m. do., 10 47-m.m. do., 8 37-m.m. do., 8 M.	7 f. tu. or l.car	1894	994,240	18·0	800	..
a.c.t.	Chanzy . (steel)	4750	348	0	46	0	19	2	2	8300	3¾	2	.. 2"–1½"	2 19-c.m., 6 14-c.m. Q.F., 4 65-m.m. do., 6 47-m.m. do., 6 37-m.m., M.	4 f. tu. or l.car	1894	360,000	19·0	413	..
b.	Charlemagne (steel)	11,232	385	0	66	7	25	10	3	14,500	15¾ 3¼ above	15¾ 3	.. 3½"&1½"	4 30½-c.m., 10 14-c.m. Q.F., 8 10-c.m. do., 26 47-m.m., 8 37-m.m. do., 8 M.	6 f. tu. or l.car	Bldg.	1,085,880	18·0	680	..
t.	Charles Martel (steel)	11,882	392	6	71	3	26	2	2	13,500	17¾	15¾ 4-in. on upper works	.. 3½"	2 30½-c.m., 2 27-c.m., 8 14-c.m. Q.F., 4 65-m.m. do., 16 47-m.m. do., 8 37-m.m. do., 8 M.	6 f. tu. or l.car	1893	1,093,909	17·5	800	..
a.c.t.	Charner . (steel)	4750	348	0	46	0	19	2	2	8300	3½	2	.. 2"–1½"	2 19-c.m., 6 14-c.m. Q.F., 4 65-m.m. do., 6 47-m.m. do., 6 37-m.m. M.	5 f. tu. or l.car	1893	353,200	19·0	413	..
a.g.b.	Cocyte . (steel)	1640	181	10	40	4	11	10	2	1700	8	8	.. 2½"	1 27-c.m. 28-ton, 2 10-c.m. Q.F., 2 47-m.m. do., 4 M.	..	1887	100,000	13·0	100	..
c.b.	Colbert . (wood)	8457	317	9	56	6	28	5	1	4652	8½	6¼	34	8 27-c.m. 23-ton, 2 24-c.m. 16-ton, 6 14-c.m. 3-ton, 2 Q.F., 14 M.	4 f. tu. or l.car	1875	..	14·47	700	..
c.b. & b.	Courbet (iron & steel)	9652	312	0	67	0	25	0	2	8100	15	9½	.. 2½"	4 34-c.m. 48-ton, 4 27-c.m. 28-ton, 6 14-c.m. 3-ton, 2 Q.F., 18 M.	5 f. tu. or l. car.	1881	800,000	15·4	900	3100
c.b. & b.	Dévastation (iron & steel)	9639	312	0	67	0	25	0	2	8320	15	9½	12½ 2½"	4 32-c.m. 48-ton, 4 27-c.m. 23-ton, 6 14-c.m. 3-ton, 2 Q.F., 18 M.	4 f. tu. or l. car.	1879	..	15·17	950	2800
a.c.b.	Duguesclin (steel, sheathed with copper)	5891	266	0	57	0	25	3	2	3300	9	8 compound	15 2"	4 24-c.m. 16-ton, 1 19-c.m. 8-ton, 6 14-c.m. 3-ton, 1 90-m.m. Q.F., 10 M.	2 l.car.	1883	220,000	14·0	400	..
a.c.	Dupuy de Lôme	6297	374	0	51	6	23	6	3	14,000	4	4	.. 2"	2 19-c.m. 11-ton, 6 16-c.m. Q.F., 12 65-m.m. & 47-m.m. do., 8 M.	4 f. tu. or l.car	1890	416,000	20·0	900	4000
a.g.b.	Flamme . (special metal)	1046	165	0	32	7	10	4	2	1500	10	4-in. shield	.. 2"	1 24-c.m. 16-ton, 1 9-c.m., 4 M.	1 f. tu.	1885	68,000	13·0	120	..
b.	Formidable (steel)	11,441	321	6	69	6	26	2	2	9700	21½	17¾	14 3"	3 37-c.m. 75 ton, 4 16-c.m. Q.F., 8 14-c.m. do., 9 47-m.m. do., 14 M.	6 f. tu.	1885	467,520 hull, 85,800 machinery.	16·2	1200	..

(A) Tonnages given in French lists are either from Durassier or M. Weyl.

(*d*) Ships marked thus are, it is stated, unfit for service without repair.

FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length at Water Line.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Battery or Turret.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		A tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons.	knots.
c.b. & b.	**Friedland** . (iron)	8824	317 0	58 0	29 11	1	4428	8	7	15	8 27-c.m. 23-ton, 8 14-c.m. 3-ton, 20 M.	4 f. tu. or l.car	1873	..	13·3	800	..
c.d.s., t.	**Fulminant** (iron and steel)	5651	248 0	57 9	21 4	1	4500	13	12	16 2″	2 27-c.m. 23-ton, 4 47-m.m. Q.F., 6 M.	2 l.car.	1877	..	13·8	400	..
c.d.s., b.	**Furieux** (iron & steel)	6000	247 10	59 0	21 9	2	5033	20	$17\frac{3}{4}$	.. $2\frac{1}{2}$″	2 34-c.m. 48-ton, 5 Q.F., 10 M.	2 l.car.	1883	264,610	14·0	290	1500
a.g.b.	**Fusée** . (steel, copper sheathed)	1150	165 0	32 7	10 4	2	1500	10	4-in. shield	.. 2″	1 24-c.m., 1 9-c.m., 4 M.	1 l.car.	1884	68,000	13·0	120	..
b.	**Gaulois** (A 7) (steel)	11,232	385 6	66 7	25 10	3	14,500	$15\frac{3}{4}$	$15\frac{3}{4}$	.. $3\frac{1}{2}$″–$1\frac{1}{2}$″	4 30-c.m., 10 14-c.m. Q.F., 6 10-c.m. do., 36 47-m.m. & 37-m.m. do.	..	Pro.	1,085,892	18·0	680	..
a.g.b.	**Grenade** (steel, copper sheathed)	1046	165 0	32 7	10 4	ed	1500	10	4-in. shield	.. 2″	1 24-c.m., 1 9-c.m., 4 M.	1 l.car.	1888	68,000	13·0	120	..
t. & b.	**Hoche** (iron & steel) (under re-construction)	10,650	333 0	65 7	27 3	2	11,300	18	16	.. 3″	2 34-c.m. 52-ton, 2 27-c.m., 8 14-c.m. Q.F., 8 Q.F., 12 M.	5 f. tu. or l.car.	1886	700,000	16·0	800	4000
b.	**Indomptable** (iron and steel)	7168	279 10	59 0	23 6	2	6605	20	$17\frac{1}{2}$	.. 3″	2 42-c.m. 75-ton, 4 10-c.m. Q.F., 2 47-m.m. do., 16 M.	4 l.car.	1883	..	14·8	400	..
t.	**Jauréguiberry** (steel)	11,824	356 0	72 8	27 9	2	14,200	$17\frac{3}{4}$	$14\frac{1}{2}$ 4-in. on upper works	.. $2\frac{3}{4}$″	2 $30\frac{1}{2}$-c.m., 2 27-c.m., 8 14-c.m. Q.F., 4 65-m.m. do., 12 47-m.m. do., 8 37-m.m. do., 8 M.	6 f. tu. or l.car	1893	980,284	17·5	800	..
c.d.s., t.	**Jemmapes** . .	6590	284 0	57 8	22 0	2	9250	$17\frac{3}{4}$–10	$17\frac{3}{4}$	.. 4″–$2\frac{3}{4}$″	2 34-c.m. 48-ton, 4 10-c.m. (Canet), 4 47-m.m. Q.F., 10 37-m.m. M.	2 f. tu. or l.car	1892	525,000	16 7	300	..
a.c.b.	**La Galissonnière** (*d*) (wood)	4700	255 8	49 0	23 9	2	2370	6	$4\frac{3}{4}$	26	6 24-c.m. 16-ton, 6 14-c.m. 3-ton, 8 M.	..	1872	..	13·08	450	..
a.c., t.	**Latouche Tréville** (steel)	4750	348 0	46 0	19 2	2	8300	$3\frac{5}{8}$	$3\frac{3}{4}$ conning tower.	.. 2″–$1\frac{1}{2}$″	2 19-c.m., 6 14-c.m. Q.F., 4 65-m.m. do., 4 47-m.m. do., 6 37-m.m., M.	4 f. tu. or l.car	1892	360,000	19·0	406	..
b.	**Magenta** (iron and steel)	10,600	330 0	65 7	27 3	2	12,000	18	16	.. 3″	4 34-c.m. 52-ton, 17 14-c.m. Q.F., 4 65-m.m. do., 12 47-m.m. do., 8 M.	3 f. tu. or l. car.	1890	760,960 (*e*)	16·25	800	4000

b.	Marceau	(iron & steel)	10,581	330	0	65	7	27	3	2	12,000	18	16	.. 3″	4 34-c.m. 52-ton, 17 14-c.m. Q.F., 4 65-m.m. and 12 47-m.m. do., 8 M.	6 f. tu. or l.car	1887	769,080 (e)	16·4	800	4000
c.b. & b.	Marengo (d)	(wood)	7718	282	6	56	10	27	8	1	3673	8	6¼	32	4 27-c.m. 27-ton, 4 24-c.m. 16-ton, 7 14-c.m., 12 M.	4 f. tu. or l.car	1869	280,000	13·49	700	..
t.	Masséna	(steel)	11,900	368	6	66	6	26	3	3	13,600	17¾–9¾ Schneidr steel	15¼–15¾ 4-in. small tur.	.. 3½″	2 30½-c.m., 2 27-c.m., 8 14-c.m. Q.F., 8 10-c.m. do., 12 47-m.m. do., and 18 37-m.m. do., 8 M.	5 f. tu. or l.car	Bldg at S. Nazaire.	980,284	17·5	585	4000
a.g.b.	Mitraille (steel, sheathed with copper)		1130	165	0	32	7	10	4	2	1500	10	4-in. shield	.. 2″	1 24-c.m., 1 9-c.m., 4 M.	..	1886	70,000	13·0	120	..
b.	Neptune	(iron & steel)	10,630	330	0	65	7	27	3	2	12,000	18	16	.. 3″	4 34-c.m. 52-ton, 17 14-c.m. Q.F., 4 65-m.m. and 12 47-m.m. do., 8 M.	5 f. tu. or l. car.	1887	780,000 (e)	16·02	800	4000
c.b. & b.	Océan (d) .	(wood)	7750	282	6	56	10	27	3	2	3781	8	6¼	32	4 27-c.m., 4 24-c.m., 8 14-c.m. 3-ton, 3 Q.F., 12 M.	4 f. tu. or l.car	1868	..	13·7	650	..
a.g.b.	Phlégéton .	(steel)	1790	187	0	40	4	11	10	2	1700	9	8	.. 2″	1 27-c.m. 28-ton, 1 14-c.m. Q.F., 4 47-m.m. do., 4 M.	..	1890	142,000	12·4	72	..
a.c.t.	Pothuau .	(steel)	5345	370 (overall)	6	50	2	21	4	..	10,000	3⅜–2	7-inch 9½ C. T.	.. 3⅜″–1⅜″	2 19-c.m., 10 14-c.m. Q.F., 16 47-m.m. do., 8 37-m.m. do.	5 f. tu. or l. car.	Bldg.	384,000	20·0	538	..
c.b. & b.	Redoutable	(iron & steel)	8860	318	2	64	8	25	6	2	6071	14	9½	15 2½″	8 27-c.m. 24-ton, 6 14-c.m. 3-ton, 2 Q.F., 12 M.	4 f. tu. or l.car	1876	..	14·66	1000	2800
b.	Requin .	(iron & steel)	7200	279	10	59	0	24	7	2	6000	19½	17¾	.. 3″	2 42-c.m. 75-ton, 4 10-c.m. Q.F., 2 47-m.m. do., 16 M.	4 l. car.	1885	..	15·0	400	..
c.b. & b.	Richelieu .	(wood)	8767	323	6	57	10	27	11	2	4240	8½	6¼	..	6 27-c.m. 23-ton, 5 24-c.m. 16-ton, 8 14-c.m., 18 M.	4 f. tu. or l.car	1873	..	13·11	900	..
t.	Saint Louis	(steel)	11,232	385	6	66	7	25	10	3	14,500	15¾	3-15¾	3½″–1½″	4 30½-c.m., 10 14-c.m. Q.F., 8 10-c.m. do., 26 47-m.m. & 37-m.m do, 8 M.	6 f. tu. or l. car.	Bldg.	1,085,892	18·0	680	..
a.g.b.	Styx .	(steel)	1790	187	0	40	4	11	10	2	1700	9	8	.. 2	1 27-c.m. 27-ton, 1 14-c.m. Q.F., 4 47-m.m. do., 4 M.	..	1892	142,000	13·0	72	..
c.b. & b.	Suffren .	(wood)	7782	282	6	57	10	29	10	1	4288	8	6¼	32	4 27-c.m., 4 24-c.m., 6 14-c.m. 3-ton, 12 M.	4 f. tu. or l. car.	1870	..	14·3	700	..

(A) Tonnages given in this list are either from Durassier or M. Weyl. (d) "En cours de condamnation." (e) Includes armament.

FRANCE.—Armoured Ships—*continued*.

Class.	NAME.	Displacement.	Length at Water Line.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour.		Backing.	Armament.		Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
								Belt.	Battery or Turret	Deck Plating.	Guns.	Fish Torpedo Dis-chargers					
		A tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons	
c.d.s., t.	Tempête (iron & steel)	4869	248 0	57 9	16 9	1	2193	13	12	15¾ 2″	2 27-c.m. 28-ton, 4 47-m.m. Q.F., 6 M.	2 l. car.	1876	..	11·7	200	..
b.	Terrible (iron & steel)	7713	279 10	59 0	24 7	2	6230	19½	17¾	.. 3″	2 42-c.m. 75-ton, 4 10-c.m. Q.F., 2 47-m.m. do., 16 M.	4 l. car.	1881	..	14·5	400	..
c.b.	Thétis (*d*) . (wood)	3624	230 3	46 2	20 10	1	1859	6	4¾	26	6 19-c.m. 8-ton, 4 14-c.m., 4 M.	..	1867	..	12·0	300	..
c.d.s., b.	Tonnant (iron & steel)	5100	248 7	58 5	17 3	1	1935	18	14½	15¾ 3″	2 34-c.m. 48-ton, 4 M. . .	..	1880	..	11 5	200	..
c.d.s., t.	Tonnerre (iron & steel)	5589	248 0	57 9	21 4	1	4165	13	12	15¾ 2″	2 27-c.m. 28-ton, 4 47-m.m. Q.F., 6 M.	2 l. car.	1875	,,	14·01	400	..
t.	Tréhouart . (steel)	6610	284 0	58 6	22 0	2	8400	17¾ 10	14½ Base of turret, 12½	.. 4″–2¾″	2 30½-c.m., 8 10-c.m. (Canet) Q.F.. 4 47-m.m. Q.F., 10 37-m.m. M.	2 f. tu. or l. car	1893	506,960	17·0	300	..
c.b. & b.	Trident . (wood)	8456	317 9	56 4	29 1	1	5083	8½	6¼	34	8 27-c.m. 23-ton, 2 24-c.m. 16-ton, 6 14-c.m., 2 Q.F., 14 M.	6 f. tu. or l. car.	1876	..	14·17	650	..
,,	Triomphante (*d*) (wood)	4700	258 2	48 9	22 5	1	2400	..	4¾	26	6 24-c.m. 16-ton, 1 19-c.m. 8-ton, 6 14-c.m., 8 M.	2 f. tu. or l. car	1877	..	12·89	410	..
a.c.	Turenne (*d*) (wood)	6400	265 9	57 2	23 11	2	4160	10	8	15 2″	4 24-c.m. 16-ton, 2 19-c.m. 8-ton, 6 14-c.m. 3-ton, 12 M.	2 f. tu. or l. car	1879	..	14·14	500	..
c.d.s., t.	Valmy . (steel)	6590	284 0	57 8	22 0	2	8400	17¾–10	17¾	.. 4″–2¾″	2 34-c.m. 48-ton, 4 10-c.m. (Canet), 4 47-m.m. Q.F., 10 37-m.m. M.	2 f. tu. or l. car	1892	525,000	17·0	300	..
a.c.	Vauban . (steel)	6150	267 9	57 3	24 0	2	4560	10	8	15 2″	4 24-c.m. 16-ton, 1 19-c.m., 6 14-c.m., 12 M.	2 l. car.	1882	..	14·32	550	..
c.d.s., t.	Vengeur (iron & steel)	4700	248 0	57 9	16 9	2	2030	13	12	15¾ 2″	2 34-c.m. 48-ton, 4 47-m.m. Q.F., 6 M.	2 l. car.	1878	..	10·83	200	..
c.b. & b.	Victorieuse (*d*) (wood)	4700	258 2	48 9	22 5	1	2214	6	4¾	26	6 24-c.m. 16-ton, 1 19-c.m. 8-ton, 6 14-c.m., 8 M.	2 f. tu. or l. car	1875	..	12·75	400	..

(A) Tonnages given in this list are either from Durassier or M. Weyl.

(*d*) "En cours de condamnation."

FRANCE.—Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Dischargers for Torpedoes.	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		A tons.	ft. in.	ft. in.	ft. in.							£	knots.	tons.	knots.
cr. 2ndclass	Alger . . . P. 3½"	4122	346 0	45 3	19 6	2	8254	steel	4 16-c.m. Q.F., 6 14-c.m. do., 10 other Q.F., 10 M.	4 f. tu. or l.car	1889	280,000	19·61	860	..
cr. 2ndclass	Aréthuse	3649	277 6	43 6	21 9	1	4200	wood	4 16-c.m. 5-ton, 22 14-c.m. 3-ton, 8 M.	..	1882	..	14·0	500	..
g.v.	Aspic	480	145 4	23 10	10 6	1	453	composite	2 14-c.m. 3-ton, 2 10-cm. . .	..	1880	..	10·3	50	..
cr. 3rd class	Beautemps-Beaupré . .	1246	204 8	34 2	15 10	1	985	wood	6 14-c.m. 3-ton, 8 M. . . .	..	1872	..	12·6	250	..
d.v.	Bisson	827	199 5	28 5	12 8	1	849	wood	3 14-c.m. 3-ton, 1 10-c.m., 5 M. .	..	1874	..	11·78	200	..
to.g.b.	Bombe	395	196 10	21 7	5 11	2	2000	steel	4 47-m.m. Q.F., 3 M. . .	2 f. tu. or l.car	1885	..	18·0	100	..
cr. 2ndclass	Bugeaud . . . P. 4"-2¾"	3722	308 6	43 6	20 10	2	9000	steel	6 16-c.m. Q.F., 4 10-c.m. do., 8 47-m.m. do., 12 37-m.m. M.	6 f. tu. or l.car	1893	260,330	19·25	587	..
g.v.	Capricorne. . . .	480	148 4	23 10	10 5	1	443	wood	2 14-c.m. 3-ton, 2 10-c.m. . .	..	1882	..	11·18	70	..
to.g.b.	Casabianca . . .	945	262 6	27 4	10 3	2	5000	steel	1 10-c.m. Q.F., 3 65-m.m. do., 5 47-m.m., 4 37-m.m. do.	6 f. tu. or l.car	Bldg.	..	21·5	117	..
cr. 2ndclass	Cassard . . . P. 3¼"-1¼"	3972	325 6	44 11	19 0	2	9600	steel	6 16-c.m. Q.F., 4 10-c.m. do., 12 47-m.m., 10 37-m.m. M.	6 f. tu. or l.	1894	272,000	19·2	610	..
to.g.b.	Cassini	945	262 6	27 4	11 6	2	5000	steel	1 18-c.m. Q.F., 3 65-m.m. do., 4 37-m.m. do.	2 f. tu. or l.car	1894	98,500	21·5	110	..
cr. 2ndclass	Catinat (ex G 4) . . P. 1¾"-1¼"	3998	328 9	41 4	19 8	2	9000	steel cop. sheathed	4 16-c.m. Q.F., 10 10-c.m. do., 14 47-m.m., 4 37-m.m. M.	6 f. tu. or l.car	1894	..	19·0	610	..
cr. 1st class	Cécille . . . P. 2"	5766	378 9	49 3	19 9	2	10,200	iron and steel	8 16-c.m. Q.F., 10 14-c.m. do., 6 47-m.m. do., 14 M.	4 f. tu. or l.car	1888	299,666	19·0	910	..
cr. 2ndclass	Chasseloup-Laubat . P. 4"-2¾"	3722	308 6	43 6	20 10	2	9000	steel	6 16-c.m. Q.F., 4 10-c.m. do., 8 47-m.m. do., 12 37-m.m. M.	6 f. tu. or l.car	1893	256,320	19·25	587	..
cr. 3rd class	Coetlogon . . P. 1½"	1848	312 0	30 5	14 0	2	5800	steel	4 14-c.m. Q.F., 3 other Q.F., 4 M. .	5 f. tu. or l.car	1889	134,000	19·3	200	2400
g.v.	Comète	473	151 6	24 9	10 6	1	631	composite	2 14-c.m., 2 10-c.m., 2 M. . .	..	1884	..	12.2	60	..
to. cr.	Condor . . . P. 1½"	1240	216 6	29 3	15 5	2	3800	steel	5 10-c.m. Q.F., 1 65-m.m. do., 6 M.	5 f. tu. or l.car	1885	80,000	17·7	160	..

(A) Tonnages given in this list are either from Durassier or M. Weyl.

FRANCE.—Unarmoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Dis-chargers for Fish Tor-pedoes.	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		A tons.	ft. in.	ft. in.	ft. in.							£	knots.	tons.	knots.
cr. 3rd class	Cosmao . . . P. 1½"	1877	312 0	30 5	14 0	2	6000	steel	4 14-c.m. Q.F., 3 other Q.F., 4 M. .	5 f. tu. or l.car	1888	133,000	20·5	200	2400
to.g.b.	Couleuvrine . . .	395	196 10	21 7	5 11	2	2047	steel	4 47-m.m. Q.F., 3 M. . . .	2 f. tu. or l.car	1885	..	18·0	100	..
to.g.b.	Dague	395	196 10	21 7	5 11	2	2000	steel	4 47-m.m. Q.F., 3 M. . . .	2 f. tu. or l.car	1885	..	18·0	100	..
cr. 2nd class	D'Assas . . . P. 3¼"–1¼"	3992	325 6	44 11	19 0	2	9600	steel	6 16-c.m. Q.F., 4 10-c.m. do., 12 47-m.m., 10 37-m.m. rev.	6 f. tu. or l.car	Bldg.	..	19·0	610	..
cr. 2nd class	Davout . . . P. 2⅜"	3027	297 6	40 0	17 6	2	8881	steel	6 16-c.m. Q.F., 4 10-c.m. do., 4 65-m.m. do., 4 47-m.m. do., 6 M.	4 f. tu. or l.car	1890	..	20·07	600	4000 kts. at 12½ kts.
cr. 1st class	D'Entrecasteaux . P. 4"–¾"	8114	384 0	58 6	23 6	2	14,000	steel 10 shields	2 24-c.m., 12 14-c.m. Q.F., 12 47-m.m. do., 4 37-m.m. do.	7 f. tu. or l.car (2 sub)	Bldg.	620,000	19·0	1000	..
cr. 2nd class	Descartes . . . P. 1⅜"	4000	316 0	42 4	19 9	2	9000	steel, cop. shd.	4 16-c.m. Q.F., 10 10-c.m. do., 14 47-m.m. do., 8 37 m.m. M. .	4 f. tu. or l car	1894	258,800	19·0	800	6000
cr. 3rd class	D'Estaing	2236	262 5	37 5	18 8	1	3700	wood & iron	15 14-c.m. 3-ton, 8 M. . . .	..	1879	..	15·31	300	..
to.g.b.	D'Iberville	925	262 6	27 0	11 2	2	5060	steel	1 10-c.m. Q.F., 1 65-m.m. do., 4 37-m.m. do.	6 f. tu.	1893	99,120	21·6	117	4500
to.g.b.	Dragonne	395	196 10	21 7	5 11	2	2000	steel	4 47-m.m. Q.F., 3 M. . . .	2 f. tu. or l.car	1885	..	18·0	100	..
cr. 2nd class	Dubourdieu . . .	3566	253 7	46 6	22 10	1	3300	wood	4 16-c.m. 5-ton, 12 14-c.m., 10 M.	2 f. tu. or l.car	1884	154,553	14·0	600	..
cr. 3rd class	Duchaffault . . .	1289	204 8	34 2	16 0	1	1214	wood	6 14-c.m. 3-ton, 6 M. . . .	..	1872	..	12·72	250	..
cr. 2nd class	Duchayla . . . P. 3¼"–1¼"	3992	325 6	44 11	19 0	2	9600	steel & copper sheathed	6 16-c.m. Q.F., 4 10-c.m. do., 12 47-m.m. do., 10 37-m.m. rev.	6 f. tu. or l.car	Bldg.	272,000	19·0	610	..
cr. 2nd class	Duguay Trouin . . .	3661	296 3	43 4	20 6	1	4399	iron & wood	5 16-c.m. 5 14-c.m. 3-ton., 4 47-m.m. Q.F., 5 M.	2 f. tu. or l.car	1877	..	15·9	700	..
g.v.	Dumont d'Urville . .	825	201 11	28 6	13 8	1	1081	wood	4 14-c.m. 3-ton, 1 10-c.m., 1 65-m.m., 2 M	..	1878	..	11·6	200	..
cr. 3rd class	Dupetit Thouars . .	1931	257 10	35 9	16 0	1	2018	wood	10 14-c.m. 3-ton, 8 M. . . .	..	1874	..	15·07	300	..

cr. 2nd class	Duquesne		5824	333	5	50	3	25		1	6589	iron & wood	7 16-c.m. Q.F., 14 14-c.m. do., 8 M.	..	1876	..	16·9	900	..
cr. 2nd class	E (4) (Catinat type)		..	..		..		..		..	..	..	.. ..	..	Pro.	260,000	19·0	..	..
cr. 3rd class	Éclaireur		1658	236	3	35	5	17	0	1	2050	iron & wood	8 14-c.m. 3-ton, 6 M.	..	1877	..	15·0	200	..
to.cr.	Epervier	P. 1½"	1240	216	6	29	3	15	5	2	3200	steel	5 10-c.m. Q.F., 1 65-m.m. do., 6 M.	5 f. tu. or l.car	1885	80,000	17·6	160	..
g.v.	Etoile		502	149	3	24	7	8	4	2	450	composite	6 10-c.m., 1 65-m.m., 2 M.	..	1885	..	10·0	60	..
cr. 3rd class	Fabert		1927	294	4	36	0	18	4	1	1107	wood	8 14-c.m. 5-ton, 4 M.	..	1874	..	12·42	300	..
to.cr.	Faucon	P. 1½"	1240	216	6	29	3	15	5	2	3200	steel	5 10-c.m. Q.F., 1 65-c.m. do., 6 M.	5 f. tu. or l.car	1887	80,000	17·1	150	..
to.g.b.	Flèche		395	196	10	21	7	5	11	2	2000	"	4 47-m.m. Q.F., 3 M.	2 f. tu. or l.car	1885	..	18·0	100	..
cr. 3rd class	Fleurus		1310	223	2	29	3	14	0	2	4000	"	5 10-c.m. Q.F., 6 47-m.m. do., 4 M.	4 f. tu. or l. car	1893	116,300	18·0	116	2000
cr. 3rd class	Forbin	P. 1½"	1848	312	0	30	5	16	0	2	5700	"	4 14-c.m. Q.F., 3 other Q.F., 4 M.	5 f. tu. or l.car	1888	..	20·6	200	2000
cr. 3rd class	Forfait		2321	249	4	38	0	18	0	1	2764	wood & iron	15 14-c.m. 3-ton, 8 M.	..	1879	..	13·44	400	..
cr.	Foudre (torpedo depôt ship)	P. 1¼"	5970	370	6	51	3	20	2	2	11,400	steel	8 10-c.m. Q.F., 4 6½-c.m. do., 4 47-m.m. do.	5 f. tu.	Bldg.	399,000	19·0	845	..
cr. 2nd class	Friant	P. 4"-2¾"	3722	308	6	43	6	20	10	2	9000	"	6 16-c.m. Q.F., 4 10-c.m. do., 8 47-m.m. do., 12 37-m.m. M.	6 f. tu. or l. car	1893	308,750	19·25	587	..
g.v.	Fulton		811	199	5	28	5	12	8	1	850	wood	2 14-c.m. 3-ton, 1 10-c.m., 5 M.	..	1887	37,000	13·0	160	..
g.v.	Gabes		490	151	6	24	9	10	6	1	450	comp.	2 14-c.m., 2 10-c.m., 2 M.	..	1884	..	11·0	60	..
cr. 3rd class	Galilée	P. 1½"	2317	321	6	35	1	14	7	2	6500	steel	4 14-c.m. Q.F., 2 10-c.m. do., 8 47-m.m. do., 4 37-m.m. do., 4 M.	4 f. tu. or l. car	Bldg.	171,520	20·0	226	..
cr. 3rd class	Hirondelle (*d*)		1200	249	6	30	4	12	8	2	1780	wood	2 10-c.m., 8 M.	..	1869	..	15·5	150	..
cr. 3rd class	Hugon (*d*)		1246	204	5	34	2	15	10	1	1054	"	6 14-c.m. 3-ton, 5 M.	..	1872	..	11·72	250	..
g.v.	Hussard		825	201	10	28	6	13	7	1	850	"	4 14-c.m., 2 M.	..	1877	..	12·08	200	..
d.v.	Inconstant		811	199	5	28	5	12	7	1	850	wood	2 14-c.m., 1 10-c.m., 5 M.	..	1886	37,000	13·0	160	..
cr. 2nd class	Iphigénie (Training ship)		3346	244	6	46	6	22	4	1	2800	wood	6 16-c.m. 5-ton, 2 9-c.m., 10 M., 3 l.	..	1881	..	14·6	400	..
cr. 2nd class	Isly	P. 3½"	4160	346	0	43	6	19	6	2	8100	steel	4 16-c.m. Q.F., 6 14-c.m. do., 6 47-m.m. do., 8 M.	5 f. tu. or l.car	1891	252,760	(*b*) 18·1	880	..

(A) Tonnages given in this list are either from Durassier or M. Weyl. (*b*) Trial stated to have been made in bad weather. (*d*) "Condamnation prévue.

S

FRANCE.—Unarmoured Ships—*continued.*

Class.	NAME.		Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
			A tons.	ft. in.	ft. in.	ft. in.							£	knts.	tons.	knots.
cr. 2nd class	Jean Bart	P. 3½″	4160	346 0	43 6	19 6	2	8000	steel	4 16-c.m. Q.F., 6 14-c.m. do., 6 47-m.m. do., 8 M.	5 f. tu. or l. car	1889	283,240	19·0	940	..
cr. 3rd class	K1, K2		2100	..	..	..	..	..	..	4 14-c.m., 5 65-m.m., and several 37-m.m. Q.F.	..	Pro.	144,000	17·0	..	..
cr. 3rd class	Lalande	P. 1½″	1877	311 6	31 2	14 0	2	6000	steel	6 14-c.m. 3-ton, 5 M.	5 f. tu. or l. car	1888	133,800	22·0	200	2400
to.g.b.	Lance		395	196 10	21 7	5 11	2	2000	,,	4 47-m.m. Q.F., 3 M.	2 f. tu. or l. car	1886	..	18·0	100	..
cr. 3rd class	Lapérouse		2319	262 5	37 5	18 8	1	2280	wood & iron	15 14-c.m. 3-ton, 8 M.	..	1877	..	14·73	300	..
cr 3rd class	Lavoisier	P.	2300	321 6	32 10	17 0	2	6600	steel	4 14-c.m. Q.F., 2 10-c.m. do., 8 47-m.m. do., 4 37-m.m. do., 4 M.	4 f. tu. or l. car	Bldg.	..	20·0	..	..
to.g.b.	Léger		450	197 0	23 0	10 6	2	2230	steel	1 10-c.m. Q.F., 3 65-m.m. do., 4 37-m.m. do.	3 f. tu. or l. car	1891	52,000	18·8	130	..
to.g.b.	Lévrier		450	197 0	23 0	10 6	2	2200	,,	1 10-c.m. Q.F., 3 65-m.m. do., 4 37-m.m. do.	3 f. tu. or l. car	1891	52,000	18·5	130	..
cr. 3rd class	Linois	P. 1½″	2275	321 6	34 6	17 5	2	6600	steel	4 14-c.m. Q.F., 2 10-c.m. do., 8 47-m.m. do., 4 37-m.m. do., 4 M.	4 f. tu. or l. car	1894	163,014	20·0	200	..
g.v.	Lion		473	151 6	24 9	10 6	1	576	composite	2 14-c.m. 3 ton, 4 M.	..	1884	..	11·8	70	..
g.v.	Lutin		474	141 9	23 11	9 4	1	373	,,	2 14-c.m., 2 10-c.m.	..	1877	..	10·0	60	..
g.v.	Lynx		474	141 9	23 11	9 4	1	427	,,	2 14-c.m., 2 10-c.m.	..	1878	..	10·38	60	..
cr. 3rd class	Magon		2294	249 4	38 0	18 0	1	2462	wood & iron	15 14-c.m. 3-ton, 8 M.	..	1881	..	14·17	350	..
g.v.	Météore		473	151 6	24 9	10 6	1	450	composite	2 14-c.m., 3 M.	..	1884	..	10·0	70	..
cr. 3rd class	Milan		1550	303 2	32 10	14 7	2	4132	steel	5 10-c.m. Q.F., 8 M.	2 f. tu. or l. car	1886	..	18·1	400	..
cr. 2nd class	Naiade		3525	246 0	47 2	22 10	1	2700	iron, cop. shd.	2 16-c.m. 5-ton, 18 14-c.m., 10 M.	4 f. tu. or l. car	1881	..	13·68	500	..
cr. 1st class	Two new ships	P.	8500	..	..	..	..	26,000	..	2 16-c.m., 6 14-c.m., and 10 47-m.m. Q.F.	..	Pro.	640,000 each	23·0	..	7500 at 12 knots
cr. 3rd class	Nielly		2257	262 5	37 5	18 8	1	2921	wood & iron	15 14-c.m. 3-ton, 8 M.	..	1880	..	15·23	300	..
g.v.	Papin		811	199 6	28 6	13 7	1	850	wood & iron	2 14-c.m., 1 10-c.m., 5 M.	..	1886	37,000	13·0	160	..
g.v.	Parseval		860	197 6	28 0	12 2	1	918	wood & iron	4 14-c.m., 4 M.	..	1879	..	12·33	150	..
cr. 2nd class	Pascal	P. 1¾″	3988	315 6	42 4	19 9	2	9000	steel	4 16-c.m. Q.F., 10 10-c.m. do., 14 47-m.m. do., 8 37-m.m. M.	4 f. tu. or l. car	Bldg.	268,120	19·25	587	..

cr 3rd class	Primauguet		2270	262	5	37	5	18	8	1	2268	wood & iron	15 14-c.m. 3-ton, 8 M.	..	1882	..	14·50	300	..
g.v.	Raymond		1243	223	0	..		..		..	2200	..	1 4·7-in. Q.F., 5 10-c.m. do., and 7 37-m.m. do.	..	Pro.	96,287	15·0	499	..
cr. 3rd class	Rigault de Genouilly		1713	236	3	35	5	17	0	1	2050	wood and iron topsides	8 14-c.m. 3-ton, 8 M.	..	1876	..	14·49	200	..
cr. 3rd class	Roland		2819	249	4	38	0	17	7	1	2294	"	15 14-c.m. 3-ton, 8 M.	..	1882	..	14·50	350	..
g.v.	Sagittaire		450	148	4	23	10	10	5	1	518	wood & iron	2 14-c.m., 2 10-c.m.	..	1881	..	11·05	70	..
to.g.b.	Sainte Barbe		395	196	10	21	7	5	11	2	2000	steel	4 47-m.m. Q.F., 3 M.	2 f. tu. or l.car	1885	..	18·0	100	..
"	Salve		395	196	10	21	7	5	11	2	2000	"	4 47-m.m. Q.F., 3 M.	2 f. tu. or l.car	1886	..	18·0	100	..
g.v.	Scorpion		473	151	6	24	9	10	6	1	511	composite	2 14-c.m. 3-ton, 3 M.	..	1883	..	11·0	70	..
cr. 3rd class	Segond (*d*)		1264	204	8	34	2	15	10	1	894	wood	6 14-c.m. 3-ton, 4 M.	..	1869	..	11·26	250	..
cr. 2nd class	Sfax	P. 1½"	4502	288	9	49	3	24	9	2	6034	steel & wood	6 16-c.m. Q.F., 10 14-c.m. do., 10 M.	5 f. tu. or l.car	1884	200,000	16·84	1000	..
cr. 2nd class	Suchet	P. 2⅜"	3430	318	3	43	6	17	6	2	9000	steel	4 16-c.m. Q.F., 4 10-c.m. do., 4 47-m.m. do., 12 37-m.m. do., 6 M.	7 f. tu. or l.car	1893	226,360	20·0	480	4000 at 12½ kts.
cr. 3rd class	Surcouf	P. 1½"	1848	312	0	30	5	14	0	2	6000	"	4 14-c.m. Q.F., 3 other Q.F., 4 M.	5 f. tu. or l.car	1888	131,200	20·5	200	2400
g.v.	Surprise		626	183	9	24	7	12	3	2	850	steel, cop. shd.	2 10-c.m. Q.F., 4 65-m.m. do., 4 37-m.m. do.	..	Bldg.	44,000	13·0	73	..
cr. 1st class	Tage	P. 2"	7345	390	0	53	8	22	10	2	12,410	steel	8 16-c.m. 5-ton, 10 14-c.m. 3-ton, 2 65-m.m., 6 Q.F., 14 M.	7 f. tu. or l.car	1886	..	19·0	1000	..
cr. 2nd class	Tourville		5743	333	5	50	3	25	4	1	7466	iron & wood	7 16-c.m. Q.F., 14 14-c.m. do., 8 M.	..	1876	..	16·89	800	..
cr. 3rd class	Troude	P. 1½"	1877	311	6	31	2	14	0	2	6000	steel	4 14-c.m. Q.F., 3 other do., 4 M.	5 f. tu. or l.car	1888	..	20·9	200	2400
cr. 3rd class	Vautour	P. 1½"	1280	216	6	29	3	15	5	2	3391	steel	5 10-c.m. Q.F., 1 65-m.m. do., 6 M.	5 f. tu. or l.car	1886	..	17·3	150	..
cr. 3rd class	Villars		2419	249	4	38	0	17	7	1	2960	wood & iron	15 14-c.m. 3-ton, 8 M.	..	1879	80,000	14·25	350	..
g.v.	Vipère		463	145	4	23	10	10	6	1	427	composite	2 14-c.m., 2 10-c.m.	..	1881	..	10·3	60	..
g.v.	Voltigeur		851	199	5	28	5	12	7	1	999	wood & iron	4 14-c.m., 4 M.	..	1878	..	12·48	150	..
cr. 3rd class	Wattignies		1310	230	0	29	3	15	0	2	4189	steel	5 10-c.m. Q.F., 6 47-m.m. do., 7 37-m.m. M.	4 f. tu. or l.car	1891	111,000	18·61	160	1800 at 12½ kts.

(A) Tonnages given in this list are either from Durassier or M. Weyl. (*d*) "En cours de condamnation."

Five river and local (*screw*) *despatch vessels* (*Avisos de* 2 *et* 3 *class*), of 200 to 600 tons; 100 to 700 I.H.P.; *sixteen* (*paddle*) *despatch vessels.*
Fifteen (*screw*) *and eighteen* (*paddle*) *river gunboats* (*Chaloupes canonnières*).

GERMANY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.		Beam.		Draught of Water.		Propellers.	Indicated Horse-power.	Armour.		Backing.	Armament.		Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
											Belt or Citadel	Turret, Barbette or Breastwork.	Deck Plating.	Guns.	Fish Torpedo Dis-chargers					
		tons.	ft.	in.	ft.	in.	ft.	in.			inches.	inches.	ins.				£	knots.	tons.	knots.
c.d.s.b.	Aegir (ex T.)	3600	240	0	49	3	17	9	2	4800	9½	8 barbette	.. 2″	3 24-c.m., 8 87-m.m. Q.F.	4 f. tu. or l. car	1895	233,500	16·0	..	..
b. 2nd class	Baden (iron)	7400	298	0	60	0	19	8	2	5600	16	10 on barbette	8	6 26-c.m. 18-ton Krupp, 4 10½-c.m. Q.F., 6 87-m.m. do., 2 l.	4 f. tu. or l. car	1880	444,886	14·0	700	..
a.g.b.	Basilisk (iron)	1109	143	0	35	6	10	2	2	700	8	8 turret	8 2′	1 30½-c.m. 35-ton, 2 M.	2 f. tu.	1878	58,042	9·0	40	..
b. 2nd class	Bayern (iron)	7400	298	0	60	0	19	8	2	5600	16	10 barbette	8 2″	6 26-c.m. 18-ton Krupp, 4 10½-c.m. Q.F., 6 87-m.m. do., 2 l.	4 f. tu. or l. car	1878	406,660	14·0	700	..
c.d.s.b.	Beowulf (steel)	3500	240	0	49	3	17	9	2	4800	9½	8 barbette	.. 2″	3 24-c.m. 19-ton, 8 87-m.m. Q.F.	4 f. tu. or l. car	1890	175,000	15·0	..	..
a.g.b.	Biene (iron)	1109	143	0	35	6	10	2	2	700	8	8 turret	8 2″	1 30½-c.m. 35-ton, 2 M.	2 f. tu.	1876	62,853	10·0	40	..
b. 1st class	Brandenburg	9842	354	4	64	0	24	7	2	9640	15¾ to 11¾ comp.	11¾ barbette comp.	8 2½″	6 28-c.m., 6 10½-c.m. Q.F., 8 8·7-c.m. do., 8 M., 2 l.	7 f. tu. or l. car	1891	..	16·5	..	..
a.g.b.	Camäleon (iron)	1109	143	0	35	6	10	2	2	700	8	8 turret	8 2″	1 30½-c.m. 35-ton, 2 M.	2 f. tu.	1878	57,564	10·0	40	..
”	Crocodil (iron)	1109	143	0	35	6	10	2	2	700	8	8 turret	8 2″	1 30½-c.m. 35-ton, 2 M.	2 f. tu.	1879	57,237	10·0	40	..
c.b. 2nd class	Deutschland (iron)	7676	280	0	62	4	24	7	1	8000	10	8	10 2″	8 26-c.m. 22-ton, 5 15-c.m., 5 87-m.m. Q.F., 4 M., 4 l.	5 f. tu. or l. car	1874	412,022	14·5	710	3400
t. 3rd class	Friedrich der Grosse (iron)	6770	307	0	53	6	24	7	1	4930	9¼	8 breastwork, 10 turret	8¼	4 26-c.m. 18-ton Krupp, 2 17-c.m. 6-ton, 10 8·7-c.m. Q.F., 6 M., 2 l.	4 f. tu. or l. car.	1874	365,170	14·0	550	2500
c.d.s.b.	Frithjof (ex S.) (steel)	3500	240	0	49	3	17	9	2	4800	9½	8 barbette	.. 2″	3 24-c.m., 8 87-m.m. Q.F.	4 f. tu. or l. car	1891	175,000	16·0	..	..
c.d.s.b.	Hagen (steel)	3500	240	0	49	3	17	9	2	4800	9½	8 barbette	.. 2″	3 24-c.m., 8 87-m.m. Q.F.	4 f. tu. or l. car	1893	..	16·0	..	..
c.d.s.b.	Heimdal (steel)	3500	240	0	49	3	17	9	2	4800	9½	8 barbette	.. 2″	3 24-c.m. 19-ton Krupp, 8 87-m.m. Q.F.	4 f. tu. or l. car	1892	233,500	16·0	..	..
c.d.s.b.	Hildebrand. (steel)	3500	240	0	49	3	17	9	2	4800	9½	8 barbette	.. 2″	3 24-c.m. 19-ton Krupp, 8 87-m.m. Q.F.	4 f. tu. or l. car	1892	218,000	16.0	..	..
a.g.b.	Hummel (iron)	1109	143	0	35	6	10	2	1	700	8	8 turret	8 2″	1 30½-c.m. 35-ton, 2 M.	2 f. tu.	1881	56,741	10·0	40	..

c.b. 2nd class	Kaiser . (iron)	7676	280 0	62 4	24 7	1	7803	10	8	10 2″	8 26-c.m. 23-ton, 1 15-c.m., 6 10½-c.m., 9 87-m.m. Q.F., 4 M., 4 l.	5 f. tu. or l. car	1874	411,301	14·6	710	3400
br. 3rd class	König Wilhelm (iron)	9757	355 0	60 0	26 7	1	8350	8	7	10	20 24-c.m. 14½-ton, 1 15-c.m., 18 87-m.m. Q.F., 8 M., 4 l.	5 f. tu. or l. car	1868	505,141	14·7	700	1740
b. 1st class	Kurfürst Friedrich Wilhelm. (steel)	9842	354 4	64 0	24 7	2	9500	15¾ to 11¾ comp.	11¾ barbette comp.	8 2½	6 28-c.m., 6 10½-c.m. Q.F., 8 8·7-c.m. do., 8 M., 2 l.	7 f. tu. or l. car	1891	..	15·0	..	..
a.g.b.	Mücke . (iron)	1109	143 0	35 6	10 2	2	700	8	8 turret	8 2″	1 30½-c.m. 35-ton, 2 M. . . .	2 f. tu.	1877	60,960	10·0	40	..
"	Natter . (iron)	1109	143 0	35 6	10 2	2	700	8	8 turret	8 2″	1 30½-c.m. 35-ton, 2 M. . . .	2 f. tu.	1880	52,822	10·0	40	..
c.d.s.b.	Odin (ex S.) . (steel)	3500	240 0	49 3	17 9	2	4800	9½	8 barbette	.. 2″	3 24-c.m. 19-ton, 8 8¾-c.m. Q.F. .	4 f. tu. or l. car	1894	..	16·0	..	..
b. 2nd class	Oldenburg (steel)	5200	246 0	59 0	19 6	2	3900	13 comp.	8 comp.	.. 1½″	8 24-c.m. 18-ton Krupp, 2 8¾-c.m. Q.F., 6 M.	4 f. tu. or l. car	1884	235,342	13·5	250	..
t. 3rd class	Preussen . (iron)	6770	308 6	53 6	24 7	1	4383	9	8 breastwork 10 turret	8	4 26-c.m. 18-ton Krupp, 2 17-c.m. 10 8·7-c.m. Q.F., 6 M., 2 l.	4 f. tu. or l. car	1873	351,904	14·0	550	2500
	New ship to replace Preussen . .	9842	354 4	64 0	24 7	2	10,230	15¾ to 11¾	11¾ barbette	8 2½	6 28-c.m., 6 10½-c.m. Q.F., 8 87-m m. do., 8 M., 2 l.	4 f. tu. or l. car	Pro.	..	17·2	..	..
b. 2nd class	Sachsen . (iron)	7400	298 0	60 0	19 8	2	5600	16	10 barbette	8 2″	6 26-c.m. 18-ton Krupp, 4 10½-c.m. Q.F., 6 87-m.m. do., 2 l.	4 f. tu. or l. car	1877	422,178	14·0	700	..
a.g.b.	Salamander . (iron)	1109	143 0	35 6	10 2	2	700	8	8 turret	8 2″	1 30½-c.m. 35-ton, 2 M. . . .	2 f. tu.	1880	56,914	10·0	40	..
"	Skorpion . (iron)	1109	143 0	35 6	10 2	2	700	8	8 turret	8 2″	1 30½-c.m. 35-ton, 2 M. . . .	2 f. tu.	1877	60,796	10·0	40	..
c.d.s.b.	Siegfried . (steel)	3500	240 0	49 3	17 9	2	4800	9½	8 barbette	.. 2″	3 24-c.m. 19-ton, 6 8¾-c.m. Q.F. .	4 f. tu. or l. car	1889	175,000	15·0	..	..
a.g.b.	Viper . . (iron)	1109	143 0	35 6	10 2	2	700	8	8 turret	8 2″	1 30½-c.m. 35-ton, 2 M. . . .	2 f. tu.	1876	61,463	10·0	40	400 at 9 knots
"	Wespe . . (iron)	1109	143 0	35 6	10 2	2	700	8	8 turret	8 2″	1 30½-c.m. 35-ton, 2 M. . . .	2 f. tu.	1876	53,771	10·0	40	360 at 9 knots
b. 1st class	Weissemburg (steel)	9842	354 4	64 0	24 7	2	9500	15¾ to 11¾	11¾ barbette	8 2½″	6 28-c.m., 6 10½-c.m. Q.F., 8 8·7-c.m. do., 8 M., 2 l.	7 f. tu. or l. car	1891	619,475	17·0 (*t*)	..	..
b. 1st class	Wörth . . (steel)	9842 (*t*)	354 4	64 0	24 7	2	9500	15¾ to 11¾	11¾ barbette	8 2½	6 28-c.m., 6 10½-c.m. Q.F., 8 8.7 c.m. do., 8 M., 2 l.	4 f. tu. or l. car	1892	..	17·2	..	..
b. 2nd class	Wurttemberg (iron)	7400	298 0	60 0	19 8	2	5600	16	10 barbette	8 2″	6 26-c.m. 18-ton Krupp, 4 10½-c.m. Q.F., 6 87-mm. do., 2 l.	4 f. tu. or l. car	1878	402,512	14·0	700	..

The Arminius, Friedrich Carl, and Kronprinz are now used for harbour service.

(*t*) Ste m trials.

GERMANY.—Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at ten knots.
		tons.	ft. in.	ft. in.	ft. in.							£	knots.	tons.	knots.
cr. 3rd class	Alexandrine	2373	236 3	42 7	18 4	1	2400	iron, steel, and wood	12 15-c.m. 4-ton, 2 87-m.m. Q.F., 4 M., 1 l.	1 f. tu. or l.car	1885	102,877	15·0	..	..
cr. 3rd class	Arcona	2373	236 3	42 7	18 4	1	2400	"	12 15-c.m. 4-ton, 2 87-m.m. Q.F., 4 M., 1 l.	1 f. tu. or l.car	1885	109,875	15·0	..	..
cr. 3rd class	Blitz	1382	246 0	32 10	13 5	2	2839	"	6 8·7-c.m. 9-cwt., 4 M. . . .	1 f. tu. or l.car	1882	66,935	16·0	..	..
cr.	Blücher (Torpedo school) .	2856	244 4	44 10	19 8	1	2990	iron & wood	2 15-c.m., 6 M., 2 l.	6 f. tu. or l.car	1877	136,408	14·0	..	..
to.r.	Bremse . . . . P. 2½"	866	203 5	27 10	10 6	..	1500	steel	1 21-c.m. 9-ton.	..	1884	49,308	15·0	65	..
cr. 3rd class	Buzzard	1580	256 0	30 2	..	2	2800	"	8 10½-c.m. Q.F., 4 M. . . .	2 l. car.	1890	..	16·5	..	..
to.r.	Brummer . . . . P. 2½"	866	203 5	27 10	10 6	..	1500	"	1 21-c.m. 9-ton.	..	1884	52,422	15·0	65	..
cr. 3rd class	Carola.	2169	226 4	42 7	18 4	1	2340	iron and wood	6 15-c.m. 3½ ton, 2 10½-c.m. Q.F., 8 87-m.m. do.	..	1880	109,617	14·0	..	2000
cr. 3rd class	Falke.	1600	246 0	33 6	15 0	2	1600	"	8 10½-c.m. Q.F., 4 M.	2 l. car.	1891	..	15·5	..	..
cr. 3rd class	Freya	2017	259 2	35 0	17 4	1	2471	composite	8 15-c.m., 4 M., 1 l.	..	1874	106,868	15 0	..	..
cr.	Dynamite Cruiser . . .	1030	..	..	..	2	..	steel	Dynamite guns	..	Bldg.	..	22·0	..	..
cr. 2nd class	Gefion . . . . P. 3"	4108	344 6	48 8	..	2	9000	..	8 15-c.m., 10 10½-c.m. Q.F., 6 5-c.m. do.	2 f. tu. or l.car	1893	..	20·0	..	..
cr. 2nd class	3 New ships . . . P.	..	..	..	..	..	..	..	.. .. ..	..	Pro.	..	..	..	..
cr. 3rd class	Geier (was F)	1640	246 0	33 6	15 0	..	2800	steel, wood sheathed	8 4-in. Q.F., 4 M.	2 l.car.	1894	..	16·0	..	..

cr. 3rd class	Greif		2000	318	0	32	0	13	0	2	5400	steel	2 10½-c.m. 23-cwt., 10 M.	..	1886	..	23·0	..	..
g.v.	Habicht		848	174	0	29	6	11	5	1	875	composite	1 15-c.m., 4 12-c.m., 4 87-m.m. Q.F.	..	1879	33,054	12·0	..	..
g.b.	Hyäne		489	139	8	25	1	9	10	1	340	iron	2 10½-c.m., 2 l.	..	1878	24,340	9·0	..	..
g.b.	Iltis		489	139	8	25	1	9	10	1	380	„	2 10½-c.m., 2 l.	..	1878	27,480	9·0	..	..
cr. 2nd class	Irene	P.	4400	339	6	46	0	21	0	2	8000	steel	4 15-c.m., 8 10½-c.m. Q.F., 6 5-c.m. do.	4 f. tu. or l. car	1887	220,000	19·8	900	..
cr. 3rd class	Jagd	P.	1240	275	6	31	6	13	9	2	4000	„	4 87-m.m. Q.F.	..	1888	..	20·0	..	..
cr. 1st class	Kaiserin Augusta	P. 3″	6052	393	0	49	3	23	0	3	12,000	„	12 long 15-c.m., 8 87-m.m. Q.F.	5 f. tu. or l. car	1892	..	20·0 (a)	..	10,000
to.g.b.	Komet		946	262	6	31	2	13	9	2	5000	„	4 8¾-c.m. Q.F., 9 smaller Q.F. and M.	1 l. car.	1892	..	23·0 (a)	..	..
cr. 3rd class	Kondor		1640	246	0	33	6	15	0	2	2800	steel & wood	8 10½-c.m. Q.F., 4 M.	2 l. car.	1892	..	16·5	..	..
cr. 3rd class	Kormoran		1640	246	0	33	6	15	0	2	2800	steel & wood	8 10½-c.m. Q.F., 4 M.	2 l. car	1892	..	16·0	..	..
cr. 3rd class	Marie		2100	226	4	42	7	18	4	1	2257	iron & wood	8 15-c.m. 3½-ton, 2 87-m.m. Q.F., 4 M.	1 f. tu. or l. car	1881	..	13·5	..	2000
d.v.	Meteor		946	262	6	29	6	11	6	2	4500	steel	4 8¾-c.m., 7 Q.F., 2 M.	1 l. car	1890	..	21·0	..	..
cr. 1st class	New Ship		7500 to 9000	..		..		..		..	..	..	..	..	Pro.	..	..	..	..
cr. 3rd class	Nixe		1760	177	2	42	8	18	0	1	7000	iron & wood	8 15-c.m.	..	1885	..	10 5	..	..
cr. 3rd class	Olga		2100	226	4	42	7	18	4	1	2397	iron & wood (sheathed)	8 15-c.m. 3½-ton, 4 87-m.m. Q.F., 4 M.	..	1880	113,812	14·0	..	2000
cr. 3rd class	Pfeil		1382	246	0	32	10	13	5	2	2700	steel	4 8·7-c.m	1 f. tu.	1882	73,605	16·0	..	..
cr. 2nd class	Prinzess Wilhelm	P. 3″	4400	339	6	46	0	21	0	2	8000	„	4 15-c.m., 8 10½-c.m. Q.F., 6 5-c.m. do.	4 f. tu. 1 l. car.	1887	220,000	18·7	900	..
cr. 4th class	Schwalbe		1120	203	0	30	6	12	4	2	1500	composite	8 10½-c.m. Krupp, 4 M.	..	1887	..	13·5	..	..
cr. 3rd class	See-Adler		1640	246	0	33	6	15	0	2	2800	steel & wood	8 10½-c.m., 4 M.	2 l. car.	1892	..	16·0	..	..
cr. 3rd class	Sophie		2100	226	4	42	7	18	4	1	2100	iron & wood	8 15-c.m. 3½-ton, 4 87-m.m. Q.F., 4 M.	..	1892	117,155	14·0	..	2000

(a) Speed said to be 22 knots on trial.

GERMANY.—Unarmoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dischargers.	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.							£	knots.	tons.	
cr. 4th class	Sperber	1120	236 0	29 8	12 6	2	1500	composite	8 10½-c.m., 4 M.	..	1888	..	13·5	..	..
cr. 3rd class	Wacht . . . . P.	1240	275 6	31 6	13 9	2	4000	steel	4 87-m.m. Q.F.	..	1887	..	19·6	..	..
g.b.	Wolf	489	139 8	25 1	9 10	1	340	iron	2 10½-c.m. 23-cwt., 2 l. . . .	..	1878	24,343	9·0	..	..
d.v.	Zieten	975	196 10	29 6	11 6	1	2323	”	10 M.	..	1876	81,755	16·0	140	..
to. g.b.	2 Torpedo Gunboats . .	380	..	..	..	2	..	steel	3 Q.F.	3 l. car. (1 sub.)	1891	..	26·0	..	..
”	2 Torpedo Gunboats . .	350	213 0	..	..	2	4000	steel	3 Q.F.	3 l. car.	1890 & 1891	..	26·0	..	..
”	2 Torpedo Gunboats . .	320	190 0	23 0	9 6	2	3600	”	6 M.	3 l. car.	1889	..	22·0	..	..
”	2 Torpedo Gunboats . .	300	184 0	21 8	9 6	2	2500	”	6 M.	2 l. car.	1888	..	21·0	..	..

The Charlotte, Gneisenau, Moltke, Stein and Stosch are now used as schoolships.

Note.—The torpedo-gunboats (Torpedo-Division boats) of 300 tons and over are included in this list, though they will also be found in the torpedo-boat tables.

Merchant Cruisers (Auxiliaries to the German Navy).

To what Company belonging.	Name of Ship.	Length.	Breadth.	Draught of Water.	Displacement.	Indicated H.P.	Ocean* Speed.	When Built.	Armament of each Ship.
		ft. in.	ft. in.	ft. in.	tons.		knots.		
Hamburg-American S.S. Co.	Fürst Bismarck	502 0	50 10	23 3	10,500	16,400	19½	1891	8 15-c.m., 4 12½-c.m., 2 8·8-c.m. Q.F., 2 5·7-c.m. do., 14 M.
	Normannia	498 9	57 6	22 3	10,500	16,250	19	1890	
	Columbia	462 6	56 0	19 8	9,500	13,680	19	1889	
	Augusta Victoria	459 3	56 0	23 0	9,500	12,280	18	1889	
North German Lloyds	Spree	462 6	51 10	22 0	8,900	12,770	19	1890	
	Havel	462 6	51 10	22 3	8,900	12,770	19	1890	
	Lahn	449 6	49 0	22 0	7,700	9,500	18½	1887	
	Aller	436 6	48 0	..	4,965	1,300(a)	16	1885	Not known.
	Saale	436 6	48 0	..	4,965	1,300(a)	16	1886	
	Trave	436 6	48 0	..	4,965	1,300(a)	16	1886	

* These speeds are based on reports of actual passages across the Atlantic.

(a) Nominal horse-power.

GREECE.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse power.	Armour. Belt.	Armour. Battery.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	ins.					knots.	tons.	
c.b.	Basileus Georgios (iron)	1774	200 2	32 10	15 6	2	2400	7	6	9	2 21-c.m. 10-ton (Krupp), 2 M., 4 l. . .	..	1867	..	12·0	210	..
b.	Hydra . (steel	4885	320 0	51 10	18 0	2	7000	$11\frac{3}{4}$ 3″ above water	$13\frac{3}{4}$ & $11\frac{3}{4}$	.. 2″	3 27-c.m. Canet, 5 15-c m. do., 7 57-m.m. Q.F., 16 M.	3 f. tu. or l. car	1889	..	17·0	..	..
br.	Olga . (wood)	2060	230 0	59 0	18 0	1	1950	$4\frac{3}{4}$	4	..	4 17-c.m. $5\frac{1}{2}$-ton (Krupp), 2 17-c.m. $3\frac{1}{2}$-ton do., 4 M., 4 l.	..	1869	..	10·0	240	..
b.	Psara . .	4885	320 0	51 10	18 0	2	7000	$11\frac{3}{4}$ 3″ above water	$13\frac{3}{4}$ & $11\frac{3}{4}$	.. 2″	3 27-c.m. Canet, 5 15-c.m. do., 7 6-pdr. Q.F., 16 M.	3 f. tu. or l car	1890	..	17·0	..	..
b.	Spetsai . .	4885	320 0	51 10	18 0	2	7000	$11\frac{3}{4}$ 3″ above water	$13\frac{3}{4}$ & $11\frac{3}{4}$	.. 2″	3 27-c.m. Canet, 4 15-c.m. do., 7 6-pdr. Q.F., 16 M.	3 f. tu. or l. car	1889	..	17·0	..	..

GREECE.—Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	
g.v.	Acheloos	420	138 0	24 11	11 6	1	400	steel	2 9·6-c.m. (Krupp), 3 M.	..	1884	..	10·0	50	..
g.v.	Alpheos	420	138 0	24 11	11 6	1	400	steel	2 9·6-c.m. (Krupp), 3 M.	..	1884	..	10·0	50	..
g.v.	Aphroessa	380	124 7	22 11	9 10	1	160	iron	1 8·7-c.m. (Krupp)	..	1858	..	9·0	30	..
g.v.	Eurotas	420	138 0	24 11	11 6	1	400	steel	2 9·6-c.m. (Krupp), 3 M.	..	1884	..	10·0	50	..
corv.	Hellas	1300	200 2	37 0	19 4	1	1500	wood	12 15-c.m. (Krupp), 2 M.	..	1878 (repaired)	..	11·0	230	..
cr.	Mykale	1000	210 6	32 6	..	2	1000	steel	2 M.	..	1880	..	..	..	..
corv.	Nauarchos Miaulis	1800	246 0	36 0	14 5	1	2200	iron and wood	3 17-c.m., 5½-ton (Krupp), 1 17-c.m. 3½-ton do., 2 M., 4 l.	..	1879	..	15·0	220	..
g.v.	Nauplion	380	124 7	22 11	9 10	1	160	iron	1 8·7-c.m. (Krupp)	..	1856	..	9·0	30	..
g.v.	Paralos	380	123 0	23 11	9 10	1	204	"	1 8·7-c.m. (Krupp), 1 M.	..	1858	..	8·0	60	..
g.v.	Peneus	420	138 0	24 11	12 6	1	400	steel	2 9·6-c.m. (Krupp), 3 M.	..	1884	..	10·55	50	..
g.v.	Plixaura	380	124 7	22 11	9 10	1	160	iron	1 8·7-c.m. (Krupp)	..	1856	..	9·0	55	..
g.v.	Salaminia	380	123 0	23 11	9 10	1	200	"	1 8·7-c.m. (Krupp), 1 M.	..	1858	..	8·0	60	..
corv.	Sfaktirea	1000	235 0	30 0	13 0	1	1700	steel	2 10-c.m. (Krupp), 2 M.	..	1885	..	14·5	100	..
g.v.	Syros	380	124 7	22 11	9 10	1	160	iron	1 8·7-c.m. (Krupp)	..	..	..	9·0	18	..

Torpedo depôt-ship.—Kanaris, 1100 tons, 500 I.H.P., 2 10-c.m. (Krupp) guns, 2 Whitehead torpedo-launching guns on broadside, 2 under-water torpedo tubes ahead. 14 knots speed.

There are also 2 gunboats, Ambrakia and Actæon, of 440 tons displacement, 380 horse-power, 10 knot speed, fitted with 1 26-c.m. Krupp gun and 2 machine guns.

ITALY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Citadel or Turret.	Backing. Deck Plating.	Armament. Guns.	Armament. White-head Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	ins.				£	knots.	tons.	knots.
t.	Affondatore . .(iron)	4062	290 0	40 0	20 0	1	3240	5	5 turret	9 2″	2 28-ton (Armstrong), 6 12-c.m. Q.F., 4 57-m.m. do., 4 37-m.m. do., 2 l.	2 l. car.	1865	152,480	12·0	460	1647
"	Ammiraglio di St. Bon (steel)	9800	344 6	69 4	24 9	2	13,500	9¾-4	9¾ 4″ redoubt.	.. 3″-1½″	4 10-in., 8 6-in. Q.F., 8 4·7-in. do., 16 55-m.m. do.	5 f. tu. or l. car	Bldg.	..	18·0	1000	..
a.c.	Ancona . . .(iron)	4460	256 0	50 0	25 0	1	2548	4½	4½	13¾	6 15-c.m., 6 12-c.m. Q.F., 8 57-m.m. do., 12 37-m.m. do., 2 l.	3 l. car.	1864	172,000	12·0	485	2000
b.	Andrea Doria (steel)	11,000	328 2	65 4	27 2	2	10,500	18 comp.	18 comp.	.. 3″	4 105-ton (Armstrong), 2 15-c.m. do., 4 12-c.m. Q.F., 10 57-m.m. do., 17 37-m.m. do., 2 l.	5 f. tu. or l. car (2 sub)	1885	765,500	16·1	850	4500
a.c.	Carlo Alberto . (steel)	6500	325 0	59 0	23 7	2	13,000	..	..	..	2 25-c.m., 10 15-c.m. Q.F., 6 12-c.m. do., 10 57-m.m. do., 10 37-m.m. do., 2 M., 2 l.	..	Bldg.	..	20·0	600	..
a.c.	Castelfidardo .(iron)	4250	256 0	50 0	21 11	1	2125	4½	4½	13¾	6 15-c.m., 6 12-c.m. Q.F., 8 57-m.m. do., 12 37-m.m. do., 2 l.	3 l. car.	1863	212,920	12·0	485	2600
t.	Dandolo (iron and steel) (To be re-armed (p))	11,202	340 11	64 9	26 7	2	8045	21½	18 turret	22¾ 2″	4 100-ton M.L.R. (Armstrong), 3 12-c.m. Q.F., 8 57-m.m. do., 22 37-m.m. do., 2 l.	4 f. tu. or l. car	1878	872,640	15·6	1000	3760
t.	Duilio . (iron and steel)	11,138	340 11	64 9	26 7	2	7710	21½	18 turret	22¾ 2″	4 100-ton M.L.R. (Armstrong), 3 12-c.m. Q.F., 8 57-m.m. do., 22 37-m.m. do., or M., 2 l.	4 f. tu. or l. car	1876	850,400	15·0	1000	3760
t.	Emanuele Filiberto (steel)	9800	344 6	69 4	24 9	2	13,500	9¾-4	9¾	.. 3″-1½″	4 10-in., 8 6-in. Q.F., 8 4·7-in. do., 8 57-m.m. do., 12 37-m.m. do., 2 M.	5 f. tu. or l. car	Bldg.	..	18·0	1000	..
b.	Francesco Morosini (steel)	11,000	328 2	65 4	27 2	2	10,000	18 comp.	18 comp.	.. 3″	4 105-ton (Armstrong), 2 15-c.m., 4 12-c.m. Q.F., 10 57-m.m. do., 17 37-m.m. do., 2 l.	5 f. tu. or l. car (2 sub)	1885	770,680	17·0	850	4500
a.c.	Guiseppe Garibaldi .	6500	325 0	59 0	23 7	2	13,000	..	..	..	2 25-c.m., 10 15-c.m. Q.F., 6 12-c.m. do., 10 57-m.m. do., 10 37-m.m. do., 2 M., 2 l.	..	Bldg.	..	20·0	600	..
"	Italia . . (steel)	14,387	400 6	74 0	31 2	2	11,986 (t)	16-inch funnel op'nings comp.	19 comp.	22¾ 3″	4 100-ton (Armstrong), 8 15-c.m. 4-ton, 4 12-c.m. Q.F., 12 57-m.m. do., 24 37-m.m. do., 2 l.	4 f. tu. or l. car	1880	1,167,680	18·0	1650	6000
b.	Lepanto . (steel)	14,400	400 6	74 0	31 2	2	15,800 (t)	16-inch funnel op'nings	19 comp.	22¾ 3″	4 100-ton (Armstrong), 8 15-c.m. 4-ton, 4 12-c.m. Q.F., 12 57-m.m. do., 24 37-m.m. do., 2 l.	4 f. tu. or l. car	1883	1,150,880	18·38	1650	6000

a.c.	Marco Polo .	(steel)	4583	327	0	48	3	19	6	2	10,000	4	4	1	6 15-c.m. Q.F., 10 12-c.m. do. . .	4 f. tu. or l.car	1890	..	19·0	..	..
a.c.	Maria Pia .	.(iron)	4268	256	0	49	4	22	7	1	2924	4½	4½	13¾	8 15-c.m., 5 12-c.m Q.F., 6 57-m.m. do., 8 37-m.m. do., 2 l.	2 f. tu. or l.car	1863	215,000	12·0	485	2600
a.c.	Nino Bixio .	(steel)	6500	325	0	59	0	23	7	2	14,000	..	..	..	2 25-c.m, 10 15-c.m. Q.F., 6 12-c.m. do., 10 57-m.m. do., 10 37-m.m. do., 2 M., 2 l.	..	Bldg. by con-tract.	..	20·0	600	..
b.	Re Umberto	(steel)	13,298	400	0	76	9	28	6	2	19,500	4 steel on side	18	.. 3″	4 67-ton (Armstrong), 8 15-c.m. Q.F., 16 12-c.m. do.. 15 57-m.m. do., 10 37-m.m. do., 2 l.	8 f. tu. or l.car	1888	1,058,500	18·2	1200	..
b.	Ruggiero di Lauria . (steel)		11,000	328	2	65	4	27	2	2	10,600	18 comp.	18 comp.	.. 3″	4 105-ton (Armstrong), 2 15-c.m. do., 4 12-c.m. Q.F., 10 57-m.m. do., 17 37-m.m. do., 2 l.	5 f. tu. or l.car (2 sub)	1884	777,560	17·0	850	4500
a.c.	San Martino	. (iron)	4268	256	0	49	4	22	7	1	2620	4½	4½	14	8 15-c.m., 5 12-c.m. Q.F., 6 57-m.m. do., 8 37-m.m. do., 2 l.	2 f. tu. or l.car	1863	213,880	12·0	490	..
b.	Sardegna .	(steel)	13,860 13,505 (*t*)	411	0	76	9	28 28 (*t*)	6 0	2	20,800 16,220 (*t*)	4 steel on side	14¼ comp.	.. 3″	4 67-ton (Armstrong), 8 15-c.m. Q.F., 16 4·7-in. do., 2 75-m.m. do., 10 57-m.m. do., 19 37-m.m. do., 2 l.	5 f. tu. or l.car	1890	1,057,440	19·0 19·64 (*t*)	1200	..
”	Sicilia . .	(steel)	13,298	400	0	76	9	28	6	2	19,500	4 steel on side	18 comp.	.. 3″	4 67-ton (Armstrong), 8 15-c.m. Q.F., 16 12-c.m. do., 2 75-m.m. do., 10 57-m.m. do., 10 37-m.m. do., 2 l.	5 f. tu. or l car	1891	1,000,000	18·0	1200	..
a.c.	Varese		6840	328	0	59	9	23	7	2	13,000	6	6	..	2 25-c.m., 10 15-c.m. Q.F., 6 12-c.m. do., 10 57-m.m. do., 10 37-m.m. do., 2 M., 2 l.	..	Bldg.	..	20·0	600	..
a.c.	Vettor Pisani . .		6500	325	0	59	0	23	7	2	13,000	6	6	..	2 25-c.m., 10 15-c.m. Q.F., 6 12-c.m. do., 10 57-m.m. do., 10 37-m.m. do., 2 M., 2 l.	..	Bldg.	..	20·0	6C0	..

(*p*) New armament is :—4 254-m.m. B.L., 7 152-m.m. Q.F., 5 120-m.m. Q.F. (*t*) Trial.

Note.—The Palestro, Principe Amedeo, and Roma are non-effective, or only available for coast defence.

ITALY.—Unarmoured Ships.

Class.	NAME.		Displacement.	Length.		Beam.		Mean Draught of Water.		Propellers.	Indicated Horse-power.	Material of Hull.	Armaments. Guns.	Armaments. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
			tons.	ft.	in.	ft.	in.	ft.	in.							£	knots.	tons.	knots.
cr. 3rd class	Amerigo Vespucci .	P. 1½"	2795	255	11	42	7	17	0	1	3340	wood	6 15-c.m. 4-ton, 4 57-m.m. Q.F., 6 37-m.m. do., 2 l.	2 l. car.	1882	178,800	14·0	500	..
g.v.	Andrea Provana . .		649	167	4	26	3	10	2	1	1080	"	4 12-c.m., 4 M.	..	1884	39,760	13·0	120	..
d.v.	Archimede . . .		784	230	0	26	3	10	0	1	1700	"	4 12-c.m., 2 57 Q.F., 2 M. . . .	2 l. car	1887	60,160	16·0	210	..
to.g.b.	Aretusa . . .	P. 1"	846	230	0	26	10	11	9	2	4420	"	1 12-c.m. Q.F., 6 57-m.m. do., and 3 37-m.m. do., 3 M.	6 f. tu. or l.car	1891	73,920	20·7	180	..
cr. 3rd class	Calabria . . .	P. 2"–1"	2470	249	4	42	0	16 aft.	7	2	6500	steel	4 15-c.m. Q.F., 6 12-c.m. do., 1 75-c.m. do., 8 57-m.m. do., 8 37-m.m. do., 2 M.	2 f tu or l.car	1894	..	20·0 19·0 (t)	..	..
to.g.b.	Calatafimi (ex Tersicore)	P. 1"	840	229	6	27	0	10	2	2	4000	"	1 12-c.m. Q.F., 6 57-m.m. do., 3 37-m.m. do.	6 f. tu. or l.car	1893	68,920	20 0	120	..
to.g.b.	Caprera (ex Clio) .	P. 1"	853	230	0	27	4	10	2	2	4800 4040(?)	"	2 12-c.m., 4 57-m.m. and 2 37-m.m. Q.F.	5 l. car	1894	..	21·0	..	..
g.v.	Cariddi		1050	177	2	28	6	12	5	1	956	wood	1 16-c.m., 2 12-c.m., 2 M. . . .	..	1875	65,480	10·0	164	..
"	Castore		530	116	0	36	0	9	6	1	364	steel	1 12-c.m., 1 M.	..	1889	68,120	8·0	..	..
to.g.b.	Confienza . . .		768	230	0	25	6	9	0	2	1887	"	1 12 c.m. Q.F., 6 57-m.m. do., 3 37-m.m. do., 3 M.	4 f. tu. or l.car	1887	61,480	17·0	180	..
cr. 3rd class	Cristoforo Colombo .	P. 1½"	2675	249	0	36	0	17	6	..	3800	..	6 12-c.m., 4 57-m.m. Q.F., 4 37-m.m. do.	..	1892 Reblt	157,240	16·0	..	..
g.v.	Curtatone		1040	177	3	32	8	13	6	1	1100	steel	6 12-c.m., 4 57-m.m. Q.F., 2 37-m.m. do., 2 M.	..	1887	58,440	12·0	197	..
cr. 3rd class	Dogali . . .	P. 2½"–1"	2088	250	0	37	0	14	6	2	7600	"	6 6-inch (Armstrong), 9 57-m.m. Q.F., 2 37-m.m. do., 4 M., 1 l.	4 l. car	1887	170,000	19·66	480	..
cr. 3rd class	Elba	P. 2"–1"	2730	272	6	40	8	16	7	2	6500	"	4 15-c.m. Q.F., 6 12-c.m. do., 6 57-m.m. do.	4 l. car	1893	..	19·0	..	..
cr. 2nd class	Etna . . .	P. 1½"	3530	282	2	42	7	19	0	2	7480	steel	2 25-c.m. (Armstrong), 6 15-c.m. do., 5 57-m.m. Q.F., 8 37-m.m. do., 1 l.	4 f. tu. or l.car	1885	226,720	17·8	630	..
to g.b.	Euridice . . .	P. 1"	840	229	6	27	0	10	2	2	4000	"	1 12-c.m. Q.F., 6 57-m.m. do., 3 37-m.m. do., 2 M.	5 f. tu. or l.car	1891	..	19·8	120	..

cr. 3rd class	Etruria	P. 2″–1″	2280	262	6	39	6	16	7	2	7609	steel	4 15-c.m. Q.F., 6 12-c.m. do., 8 57-m.m. do., 4 M.	2 l. car.	1891	183,120	18·0 18·8(t)	400	..
cr. 2nd class	Fieramosca	P. 1½″	3600	290	0	43	6	19	4	2	7700	„	2 25-c.m. 25-ton, 6 6-inch, 5 57-m.m. Q.F., 8 37-m.m. do., 1 l.	4 f. tu. or l. car	1888	240,160	17·5	590	..
cr. 3rd class	Flavio Gioja	P. 1½″	2533	255	11	42	7	17	0	1	4150	„	6 12-c.m., 4 57-m.m. Q.F., 6 37-m.m. do., 2 l.	2 f. tu. or l. car	1881	193,920	15·0	500	..
to.g.b.	Folgore		370	187	0	19	8	6	7	2	2040	„	2 6-pr. and 2 3-pr. Q.F., 4 M.	4 l. car. or f. tu.	1886	39,840	20·0	60	..
d.v.	Galileo		770	230	0	26	3	8	2	1	1700	„	4 12-c.m., 2 57-m.m. Q.F., 2 M.	2 l. car	1887	56,720	15·0	210	..
cr. 3rd class	Giovanni Bausan	P. 1½″	3068	275	7	42	7	18	4	2	6500	„	2 25-c.m. 24-ton (Armstrong), 6 15-c.m. 5-ton, 4 57-mm. Q.F., 8 37-m.m. do., 1 l.	3 f. tu. or l. car (1 sub.)	1883	191,320	17·5	600	5000
to.g.b.	Goito		812	230	0	25	6	11	9	2	2620	„	4 57-m.m. Q.F., 3 37-m.m. do., 3 M.	5 f. tu. or l. car	1887	70,680	19·0	180	..
g.v.	Governolo		1255	185	0	33	9	13	9	1	1100	„	4 12-c.m. Q.F., 4 57-m.m. do., 2 37-m.m. do., 2 M.	..	1894	..	13·0	200	..
to.g.b.	Iride	P. 1″	840	229	6	27	0	10	2	2	4000	„	1 12-c.m. Q.F., 6 57-m.m. do., 3 37-m.m. do., 2 M.	6 l. car.	1891	..	19·6	120	..
cr. 3rd class	Liguria	P. 2″–1″	2280 2250(t)	262	6	39	4	16 14(t)	9 11	2	6800 5536(t)	„	4 15-c.m. Q.F., 6 12-c.m. do., 8 57-m.m. do., 8 M. (2 Maxims)	2 l. car.	1893	183,120	18·0 18.1(t)	430	..
cr. 3rd class	Lombardia	P. 2″–1″	2380	262	6	39	6	16 15	7 7(t)	2	7140 601((t)	„	4 15-c.m. Q.F., 6 12-c.m. do., 8 57-m.m. do., 6 37-m.m. do.	2 l. car.	1890	..	18·0 18·4(t)	430	..
d.v.	Marcantonio Colonna		656	216	6	23	11	10	10	1	1700	„	5 57-m.m. Q.F., 2 M.	..	1879	51,480	15·4	197	..
to.g.b.	Minerva	P. 1″	846	246	0	27	6	11	9	2	4800	„	1 12-c.m. Q.F., 6 57-m.m. do., 3 37-m.m. do., 3 M.	5 f. tu. or l. car	1892	72,920	19·0	120	..
„	Montebello		814	230	0	25	6	11	9	3	2776	„	6 57-m.m. Q.F., 5 37-m.m. do., 3 M.	4 f. tu. or l. car	1888	74,120	19·0	100	..
„	Monzambano		840	230	0	25	6	11	9	3	1953	„	6 57-m.m. Q.F., 3 37-m.m. do.	4 f. tu. or l. car	1888	70,680	17·0	100	..
to.g.b.	Partenope	P. 1″	840	246	0	27	6	11	9	2	4200	„	1 12-c.m. Q.F., 6 57-m.m. do., 3 37-m.m. do., 2 M.	5 f. tu. or l. car	1890	71,000	19 0	100	..
cr. 3rd class	Piemonte	P. 3″–1″	2500	300	0	38	0	15	0	2	12,000	„	6 6-in. Q.F., 6 4¾-in. do., 10 57-m.m. do., 6 37-m.m. do., 4 M., 1 l.	3 f. tu.	1888	223,600	21·0	560	13,000
g.v.	Poluce		530	116	0	36	0	9	6	1	..	„	1 12-c.m., 1 M.	..	1889	68,120	8·0	..	..
cr. 3rd class	Puglia	P. 2″–1″	2550	273	0	40	9	16	9	2	1000	„	18 Q.F.	..	Bl'g.	..	20·0	650	..
d.v.	Rapido		1568	262	5	30	6	12	6	1	1920	iron	5 57-m.m. Q.F., 2 M.	..	1876	77,400	13·4	300	2560
to.g.b.	Saetta		400	187	0	19	8	6	7	2	2400	steel	1 57-m.m. Q.F., 2 37-m.m. do., 4 M.	3 f. tu. or l. car	1887	38,880	20·0	90	..

(t) Trials.

ITALY.—Unarmoured Ships.—*continued*

Class.	NAME.		Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armaments. Guns.	Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
			tons.	ft. in.	ft. in.	ft. in.							£	knots.	tons.	knots.
cr.	Savoia (used as the Royal Yacht)	P. 1½″	2850	275 6	42 7	17 0	1	3310	steel	6 57-m.m. Q.F., 6 37-m.m.	2 l.car.	1883	176,160	14·0	600	..
g.v.	Scilla		1076	177 2	28 6	12 5	1	826	wood	2 57-m.m. Q.F., 2 M.	..	1874	65,520	10·0	140	..
"	Sebastiano Veniero		629	170 0	26 3	10 6	1	1160	steel	4 12-c.m., 4 M.	..	1884	39,760	13·0	150	..
d.v.	Staffetta		1388	252 7	30 10	13 2	1	1800	iron	4 12-c.m., 7 37 Q.F., 2 M.	1 l.car.	1876	82,600	13·5	300	3300
cr. 2nd class	Stromboli	P. 1½″	3475	282 2	42 7	19 0	2	6252	steel	2 25-c.m. (Armstrong), 6 15-c.m. 4-ton do., 5 57-m.m. Q.F., 9 37-m.m. do., 1 l	4 f. tu. or l.car	1886	220,120	17·0	630	..
to.g.b.	Tripoli		848	230 0	25 10	11 9	3	2543	"	6 57-m.m. Q.F., 5 37-m m. do.	5 f. tu. or l.car	1886	72,080	18·0	130	..
cr. 3rd class	Umbria	P. 2″–1″	2280	262 6	39 6	16 7 15 10 (*t*)	2	6500 7400 (*t*)	"	4 15-c.m. Q.F., 6 12-c.m. do.	4 l. car.	1891	183,120	19·0 18·9 (*t*)	430	..
to.g.b.	Urania	P. 1″	846	230 0	27 0	11 2	2	4000	"	1 12-c.m. Q.F., 6 57-m.m. do., 2 37-m.m. do.	6 f. tu. or l.car	1891	72,920	20·0	120	..
"	Two new ships (M, N)	P.	846	230 0	25 6	11 2	2	4000	"	1 12-c.m. Q.F., 6 57-m.m. do., 2 37-m.m. do.	6 f. tu. or l.car	Bldg.	60,000 each	20·0	180	..
d.v.	Vedetta		827	183 9	26 11	11 5	1	670	iron	4 12-c.m., 7 37-m m. Q.F., 2 M.	..	1866	32,400	11·0	137	..
cr. 2nd class	Vesuvio	P. 1½″	3427	282 2	42 7	19 0	2	6820	"	2 25-c.m., 6 15-c.m. 4-ton, 5 57-m.m. Q.F., 9 37-m.m. do., 1 l.	4 f. tu. or l.car	1886	218,760	17·0	600	..
g.v.	Volturno		1040	177 3	32 8	14 4	1	1100	"	6 12-c.m., 4 57-m.m. Q.F., 2 37-mm. do., 2 M.	..	1887	58,960	13·0	206	..

(*t*) Trials.

Gunboats (Staunch class).—Guardiano and Sentinella, of 265 tons, and of about 250 I.H.P., and 6 small gunboats of 87 tons and 52 H.P.

Paddle despatch vessel.—Messaggiero, of 1020 tons and 15 knots speed.

There are eight large merchant steamers on the auxiliary list of 14 to 18 knots speed. Of these, three are fitted for two torpedo-launching apparatus, and all of them with 2 12-c.m. or 2 57-m.m., and 4 3-pdr. Q.F., and 7 M. guns.

JAPAN.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Battery.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.					knots.	tons.	knots.
a.c.	Chiyoda . . (steel)	2450	308 0	42 6	14 0	2	5600	$4\frac{1}{2}$	..	.. 1″	10 12-c.m. Q.F., 14 3-pdr. do., 3 M.	3 l. car.	1889	..	19·0	240	..
b. 1st class	(No. 1)	12,450	374 0	73 0	26 6	2	14,000	18—6	14 barbette	.. $2\frac{1}{2}$″	4 12-in., 10 6-in. Q.F., 14 3-pdr. do., 10 $2\frac{1}{2}$-pdr. do.	5 f. tu. (4 sub)	Bldg.	..	18·0	1100	..
b. 1st class	(No. 2)	12,450	374 0	73 0	26 6	2	14,000	18—6	14 barbette	.. $2\frac{1}{2}$″	4 12-in., 10 6-in. Q.F., 14 3-pdr. do., 10 $2\frac{1}{2}$-pdr. do.	5 f. tu. (4 sub.)	Bldg.	..	18·0	1100	..
c.b.	Fu-Soo . . . (iron)	3718	220 0	48 0	18 4	2	3500	7	9	..	4 24-c.m. 15-ton (Krupp), 2 17-c.m. 6-ton do., 4 l., 5 M.	..	1877	..	13·2	360	4500
a.c.	Hi-yei *. . (composite)	2200	231 0	40 9	17 4	1	2490	$4\frac{1}{2}$	..	..	3 17-c.m. (Krupp), 6 15-c.m. do., 4 M., 1 l.	..	1878	..	13·0	280	..
”	Kon-go * . (composite)	2200	231 0	40 9	17 4	1	2450	$4\frac{1}{2}$	..	..	3 17-c.m. $3\frac{1}{2}$-ton (Krupp), 6 15-c.m. do., 4 M., 1 l.	..	1877	..	13·7	280	..

* These are not armoured ships in the usual sense of the term. There is no armour as against end-on fire, and no armoured deck.

JAPAN.—Unarmoured Ships.

Class.	NAME.		Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
			tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	knots.
g.v.	Akagi		615	164 0	27 0	10 0	..	700	steel	4 15-c.m. (Krupp), 1 4·7-in Q.F. (?), 2 M.	..	1888	..	12·0	..	..
cr.	Akitsusu	P.	3150	302 0	42 7	18 5	2	8400	"	4 6-in. Q.F., 6 4·7-in. do., 10 3-pr. do.	4 f. tu. or l. ca.	1892	..	19·0	..	..
"	Amaki		1030	200 0	29 6	13 9	1	720	wood	1 15-c.m. (Krupp), 4 12-c.m. do., 2 M.	..	1877	..	11·0	120	..
g.v.	Atago		615	164 0	27 0	10 0	..	700	steel	1 21-c.m. (Krupp), 1 12-c.m. do., 2 M.	..	1887	..	12·0	..	..
"	Banjo		595	154 0	25 0	12 0	1	590	wood	1 6-in., 2 4¾-in. do., 1 M.	..	1879	..	10·0	107	..
c.d.s.	Hashidate	P. 2″	4277	295 0	50 10	21 2	2	5400	steel 12″ armour on barbette aft	1 32-c.m. (Canet), 11 12-c.m. Q.F., 5 6-pdr. do., 11 3-pdr., 6 M.	4 f. tu. or l. car	1891	..	17·5	..	..
g.v.	Ho Sho		320	120 0	24 0	9 6	1	240	wood	1 7-in. M.L.R., 1 5½-in., 1 l.	..	1868	..	11·0	50	..
c.d.s.	Itsukushima	P. 2″	4277	295 0	50 10	21 2	2	5400	steel 12″ armour on barbette forward	1 32-c.m. (Canet), 11 12-c.m. do., 5 6-pdr. Q.F., 11 3-pdr. (Hotchkiss), 6 M.	4 f. tu. or l. car	1889	..	17·5	..	..
cr.	Kaimon		1490	210 0	32 0	16 5	1	1250	wood	1 17-c.m. 6-ton (Krupp), 6 12-c.m. do., 2 l.	..	1882	..	12·0	..	..
"	Katsuraki		1476	206 9	36 0	15 0	2	1600	composite	2 17-c.m. (Krupp), 5 12-c.m. do., 2 M.	2 l. car.	1885	..	13·0	..	..
g.v	Maya		615	164 0	27 0	10 0	..	700	"	4 15-c.m. (Krupp), 2 M.	..	1886	..	12·0	60	..
c.d.s.	Matsushima	P. 2″	4277	295 0	50 10	21 2	2	5400	steel 12″ armour on barbette forward	1 32-c.m. (Canet), 11 12-c.m. do., 5 6-pdr. Q.F., and 11 3-pdr. (Hotchkiss), 6 M.	4 f. tu. or l. car	1890	..	17·5	..	..

cr.	New Ship	P. 2″–1″	2700	306	9	40	0	..		2	8000	steel	2 6-in. Q.F., 6 4·7-in. do., 12 3-pr. do.	3 l. car.	Bldg.	..	20·0	..	..
"	New Ship	P. 2″–1″	2700	306	9	40	0	..		2	8000	steel	2 6-in. Q.F., 6 4·7-in. do., 12 3-pr. do.	3 l. car.	Bldg.	..	20·0	..	..
"	Muzasi		1476	206	9	36	0	15	0	2	1600	composite	2 17-c.m. (Krupp), 5 12-c.m. do., 2 M.	2 l. car.	1886	..	13·5	..	..
"	Naniwa	P. 3″–2″	3650	300	0	46	0	18	6	2	7235	steel	2 26-c.m. 28 ton (Armstrong), 6 15-c.m 5-ton (Krupp), 2 3-pr. Q.F., 10 M.	4 f. tu. or l. car	1885	..	18·72	800	9000 at 13 kts.
g.v.	Oschima		640	..		..		..		..	1200	steel	4 12-c.m. Q.F., 8 47-m.m. do.	..	1890	..	..	..	..
cr.	Sai-kio		900	200	0	30	0	13	2	1	720	steel	1 15-c.m. (Krupp), 4 12-c.m. do., 2 M.	..	1875	..	11·0	130	..
"	Takao		1760	230	0	33	0	13	0	2	2330	steel & wood	4 6-in. Q.F., 1 4¾-in. do.	2 f. tu. or l. car	1888	..	15·0	300	..
"	Takachiho	P. 3″–2″	3650	300	0	46	0	18	6	2	7500	steel	2 26-c.m. 28-ton (Armstrong), 6 15-c.m. 5-ton do., 2 3-pr. Q.F., 10 M.	4 f. tu. or l. car	1885	..	18·72	800	9000 at 13 kts.
to.g.b.	Tatsuta		875	240	0	27	6	..		2	5500	"	2 4·7-in. Q.F., 4 3-pdr. do.	5 f. tu. or l. car	1894	..	21·0	200	..
"	Ten-rio		1490	200	0	32	0	16	5	1	1250	wood	1 17-c.m. 6-ton (Krupp), 6 12-c.m. do., 2 l.	..	1882	..	12·0	256	..
g.v.	Tscho-kai		615	154	0	27	0	10	0	..	700	steel	1 21-c.m. Krupp, 1 12-c.m., 2 M.	..	1887	..	10·0	..	..
corv.	Tsukuba (training ship for cadets)		1980	194	0	36	0	18	0	1	350	wood	8 guns	..	1883	..	..	..	..
cr.	Tsukushi		1500	210	0	32	0	15	0	2	2887	steel	2 10-in. 25-ton (Armstrong), 4 4-in. do., 2 l., 4 M.	2 f. tu. or l. car	1882	..	17·0	250	..
"	Yaeyama		1600	315	0	34	6	15	0	2	5400	..	3 12-c.m., 6 M.	2 l. car.	1889	..	20·0	..	..
"	Yamato		1476	206	9	36	0	15	0	1	1600	steel	2 17-c.m. (Krupp), 5 12-c.m. do., 4 M.	2 f. tu. or l. car	1885	..	13·5	..	..
"	Yoshino	P. 4½″–1¾″	4150	350	0	46	6	17	0	2	15,000	"	4 6-in. Q.F., 8 4·7-in. do., 22 3-pdr. do.	5 f. tu. or l. car	1892	..	23·03	1000	..
"	New Ship		1800	304	6	..		13	0	..	6000	"	8 4·7-in. Q.F., 4 3-pr. do.	..	..	..	..	..	..

Two paddle despatch vessels, of 1200 to 1500 tons displacement, and 1200 to 1400 HP.

NETHERLANDS.—Armoured Ships.

Class.	NAME.	Displacement.	Length.		Beam.		Mean Draught of Water.		Propellers.	Indicated Horse-power.	Armour.		Back-ing.	Armament.		Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
											Belt.	Turret.	Deck Plating.	Guns.	Fish Torpedo Dis-chargers					
		tons.	ft.	in.	ft.	in.	ft.	in.			inches.	inches.	inches.					knots.	tons.	knots.
c.d.s.t.	Bloedhond . (iron)	1530	180	0	46	3	9	6	2	680	5½	8	9¾	1 28-c.m. 28-ton (Krupp), 1 75-m.m. do., 2 3-pdr. Q.F., 2 M.	..	1869	..	8·5	90	..
"	Buffel (a) . . (iron)	2198	195	6	40	0	15	6	2	2000	6	8	9¾ 1"	1 28-c.m. 28-ton (Krupp), 2 75-m.m. do., 4 3-pdr. Q.F., 2 M.	..	1868	..	12·4	150	..
"	Cerberus . . (iron)	1530	180	0	44	0	9	7	2	617	5½	8	9¾	1 28-c.m. 28-ton (Krupp), 1 75-m.m. do., 2 3-pdr. Q.F., 2 M.	..	1869	..	7·0	90	..
"	Draak . . (iron)	2156	201	5	49	3	10	10	2	807	8	9	11¾	2 28-c.m. (Krupp), 1 75-m.m. do., 2 3-pdr. Q.F., 2 M.	..	1877	..	8·0	100	..
"	Evertsen . (steel)	3400	283	0	47	0	16	9	2	..	6	9½	.. 2½"	3 21-c.m., 2 15-c.m., 6 75-m.m. Q.F., 6 37-m.m. do.	3 f. tu. or l. car	Bldg.	..	20·0	..	..
"	Guinea (a) . (iron)	2378	195	6	40	0	16	9	2	2000	6	8	9¾ 1"	1 28-c.m. 28-ton (Krupp), 2 75-m.m. do., 4 3-pdr. Q.F., 2 M.	..	1870	..	12·0	135	..
"	Haai . . (iron)	1566	186	4	44	0	10	2	2	672	5½	8 5¼ C.T.	9¾	1 28-c.m. 28-ton (Krupp), 1 75-m.m. do., 2 3-pdr. Q.F., 2 M.	..	1871	..	8·0	70	..
"	Heiligerlee (iron)	1530	180	0	43	7	9	6	2	630	5½	8 4½ C.T.	9¾	1 28-c.m. 28-ton (Krupp), 1 75-m.m. do., 2 3-pdr. Q.F., 2 M.	..	1868	..	8·0	90	..
"	Hijena . . (iron)	1566	186	4	44	0	10	2	2	654	5½	8 5¼ C.T.	9¾	1 28-c.m. 28-ton (Krupp), 1 75-m.m. do., 2 3-pdr. Q.F., 2 M.	..	1871	..	7·0	70	..
a.g.b.	Isala . . (iron)	367	150	11	24	11	4	3	2	306	4	5	5 ⅝"	2 12-c.m. (Krupp) . .	..	1876	..	7·0	27	..
t.	Koning der Nederlanden (iron)	5400	269	0	49	3	20	0	2	4500	8	9 8 C.T.	11¾ 3"	4 28-c.m. 25-ton M.L.R. (Armstrong), 4 12-c.m. (Krupp), 2 75-m.m. do., 4 37-m.m. Q.F., 6 M.	..	1874	..	11·0	620	..
t. & b.	Koningin Wilhelmina der Niederlanden (I) (steel, copper sheathed)	4600	328	0	49	3	19	8	2	5900	..	11	.. 3"	1 28-c.m., 1 21-c.m., 2 17-c.m., 2 7·5, 4 75-m.m. Q.F., 6 37-m.m. do., 6 M.	3 f. tu. or l. car	1892	..	17·0	450	..
c.d.s.t.	Kortenaer . (steel)	3400	283	0	47	0	16	9	2	..	6	9½	.. 2½"	3 21-c.m., 2 15-c.m., 6 75-m.m. Q.F., 6 37-m.m. do.	3 f. tu. or l. car	Bldg.	..	20·0	..	..
c.d.s.t.	Krokodil . (iron)	1530	180	0	43	7	9	6	2	630	5½	8 4½ C.T.	9¾	1 28-c.m. 28-ton (Krupp), 1 75-m.m. do., 2 3-pdr. Q.F., 2 M.	..	1868	..	8·0	90	..

c.d.s.t.	Luipaard.	(iron)	1525	186 4	44 0	9 2	2	680	5½	8 5¼ C.T.	9¾	1 28-c.m. 28-ton (Krupp), 1 75-m.m. do., 2 3-pdr. Q.F., 2 M.	..	1876	..	8·0	70	..
"	Matador	(iron)	1935	201 5	49 3	10 2	2	691	5½	9	9¾	2 28-c.m. 28-ton (Krupp), 1 75-m.m. do., 2 3-pdr. Q.F., 2 M.	..	1878	..	7·0	100	..
a.g.b.	Merva	(iron)	367	150 11	24 11	4 3	2	395	4	5	5 5/8″	2 12-c.m. (Krupp)	..	1879	..	7·0	27	..
"	Mosa	(iron)	367	150 11	24 11	4 3	2	400	4	5	5 5/8″	2 12-c.m. (Krupp)	..	1878	..	7·0	27	..
b. Ram	New Ships (A 4, A 5, A 6)	(steel)	3400	283 0	47 0	16 9	2	4800	6	9½	.. 2½″	3 21-c.m., 2 15-c.m., 6 75-m.m. Q.F., 6 37-m.m. do.	2 f. tu. or l.car	Pro.	..	16·0	..	..
c.d.s.t.	Panter	(iron)	1566	186 4	44 0	10 2	2	660	5½	8 5¼ C.T.	9¾	1 28-c.m. 28-ton (Krupp), 1 75-m.m. do., 2 3-pdr. Q.F., 2 M.	..	1870	..	7·0	70	..
c.d.s.t.	Piet-Hein		3400	283 0	47 0	16 9	2	4800	6	9½	.. 2½″	3 21-c.m., 2 15-c.m., 6 75-m.m. Q.F., 6 37-m.m. do.	2 f. tu. or l.car	1894	..	16·0	..	..
t.	Prinz Hendrik der Nederlanden	(iron)	3575	229 7	42 7	18 1	1	2000	4½	5½	9¾ 5/8″	4 23-c.m. 13-ton M.L.R. (Armstrong), 4 12-c.m. (Krupp), 2 75-m.m. do., 4 37-m.m. Q.F., 6 M.	..	1866	..	12·0	350	..
t. & b.	Reinier Claeszen	(steel)	2490	229 7	44 3	15 0	2	2400	4¾–2 comp.	11	.. 3″	1 21-c.m. (Krupp), 1 17-c.m. do., 1 7·5-c.m. do., 3 3-pdr. Q.F., 3 M.	2 f. tu. or l.car	1891	..	16·5	160	..
a.g.b.	Rhenus	(iron)	367	150 11	24 11	4 3	2	310	4	5	5 5/8″	2 12-c.m. (Krupp)	..	1877	..	7·0	27	..
c d.s.t.	Schorpioen	(iron)	2175	193 3	38 0	15 10	2	2225	6	8 4¼ P.T.	11¾	1 28-c.m. 28-ton (Krupp), 2 75-m.m. do., 5 3-pdr. Q.F., 2 M.	..	1868	..	12·0	200	1030
"	Stier.	(iron)	2069	194 10	38 0	15 6	2	2257	6	8 4¼ P.T.	9¾	1 28-c.m. 28-ton (Krupp), 2 75-m.m. do., 5 3-pdr. Q.F., 2 M.	..	1868	..	12·4	160	..
"	Tijger	(iron)	1414	187 0	44 0	8 10	2	684	5½	8 4¼ C.T.	9¾	1 28-c.m. 28-ton (Krupp), 1 75-m.m. do., 2 3-pdr. Q.F., 2 M.	..	1868	..	8·0	70	..
a.g.b.	Vahalis	(iron)	340	120 5	27 6	5 3	2	243	4½	..	7 5/8″	2 3-pdr. Q.F.	..	1870	..	6·0	22	..
c.d.s.t.	Wesp	(iron)	1566	186 4	44 0	10 2	2	744	5½	8 5¼ C.T.	9¾	1 28-c.m. 28-ton (Krupp), 1 75-m.n. do., 2 3-pdr. Q.F., 2 M.	..	1871	..	8·0	70	..

(a) These ships, as well as some others of about the same age, will shortly be removed from the effective list.

NETHERLANDS.—Unarmoured Ships.

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.	Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	knots.
cr.	Alkmaar	1010	154 3	30 2	15 9	1	732	composite	1 15-c.m. (Krupp), 6 12-c.m. do., 1 75-m.m. do., 2 37-m.m. Q.F., 2 M.	..	1874	..	10·0	130	..
g.v.	Aruba	778	147 7	29 6	12 5	1	413	"	1 15-c.m. M.L.R. (Armstrong), 2 12-c.m. (Krupp), 1 75-m.m. do., 2 37-m.m. Q.F., 2 M.	..	1873	..	9·0	100	..
cr. 1st class	Atjeh	3565	262 5	39 4	20 7	1	2700	iron & zinc sheathed	6 17-c.m. 6-ton, 8 12-c.m. (Krupp), 2 75-m.m., 8 3-pdr. Q.F., 6 M.	..	1876	..	14·5	380	3000
g.v.	Bali (I)	853	147 7	29 6	11 10	1	446	"	1 15-c.m., 3 12-c.m. do. (Krupp), 1 75-m.m., 2 37-m.m. Q.F.	..	1878	..	9·5	100	..
"	Banda (I)	645	137 10	27 7	11 10	1	198	composite	2 75-m.m. (Krupp)	..	1872	..	9·0	80	..
"	Bandjermassin (I)	654	137 10	28 10	11 10	1	370	"	1 18-c.m. 7-ton M.L.R. (Armstrong), 2 12-c.m. (Krupp), 1 75-m.m., 2 37-m.m. Q.F.	..	1874	..	9·5	85	..
"	Batavia (I)	853	147 7	29 6	11 10	1	405	iron & wood	1 18-c.m. 7-ton M.L.R. (Armstrong), 2 12-c.m. (Krupp), 1 75-m.m., 2 37-m.m. Q.F.	..	1876	..	9·0	100	..
"	Bonaire	853	147 7	29 6	11 10	1	412	"	1 15-c.m., 2 12-c.m. (Krupp), 1 75-m.m., 2 37-m.m. Q.F., 2 M.	..	1877	..	9·0	100	..
"	Borneo	829	177 2	33 10	12 6	..	1040	steel & wood	6 10½-c.m., 1 75-m.m., 2 37-m.m. Q.F., 2 M.	..	1892	..	13·0	..	..
g.v.	Brines	829	177 2	33 10	12 6	..	1040	"	6 10½-c.m., 6 Q.F.	..	1892	..	13·0	..	..
"	Ceram (I)	550	157 4	25 4	10 6	1	650	steel	3 12-c.m. (Krupp), 1 75-m.m., 2 37-m.m. Q.F.	..	1887	..	11·0	60	..
"	Condor (I)	320	126 0	21 0	10 0	1	300	composite	2 2¾-in., 2 6-pdr. Q.F.	..	1885	..	10·0	25	..
cr. 1st class	De Ruyter	3480	262 5	39 4	20 7	1	3305	iron & zinc sheathed	6 17-c.m. 6-ton, 8 12-c.m. (Krupp), 2 75-m.m., 8 3-pdr. Q.F., 6 M.	..	1880	..	14·5	380	3000
g.v.	Flamingo	400	..	..	..	..	485	..	. . . .	..	1891	..	11·35	..	..
"	Flores (I)	550	157 0	25 6	10 6	1	650	steel	3 12-c.m., 1 75-m.m., 2 37-m.m. Q.F.	..	1887	..	11·0	60	..
"	Halik (I)	350	125 0	20 0	10 0	1	300	composite	2 2¾-in. Q.F., 2 6-pdr. do.	..	1878	..	8·5	..	..
g.v.	Java (I)	1298	197 0	31 3	12 3	1	1055	iron & wood	1 6-in., 3 4¾-in., 1 75-m.m., 2 37-m.m., Q.F.	..	1885	..	10·6	125	..

cr. 1st class	Johan Willem Friso		3710	262	5	39	4	20	7	1	3000	iron & zinc sheathed	6 17-c.m. 6-ton (Krupp), 8 12-c.m., 2 75-m.m., 8 3-pdr. Q.F., 6 M.	2 l. car	1886	..	14·5	380	3000
cr. 1st class	Koningin Emma der Nederlanden		3565	262	5	39	4	20	7	1	2732	iron & zinc sheathed	6 17-c.m. 6-ton, 8 12-c.m. (Krupp), 2 75-m.m., 8 3-pdr. Q.F., 6 M.	..	1879	..	14·6	380	3000
g.v.	Lombok (I) . . .		596	158	0	26	3	10	5	..	950	steel	3 4·7-in., 1 75-m.m., 2 3-pdr. Q.F. . .	..	1890	..	12·5	..	..
„	Macassar (I) . .		853	147	7	29	6	11	10	1	394	iron & wood	1 18-c.m. 7-ton M.L.R. (Armstrong), 2 12-c.m. (Krupp), 1 75-m.m., 2 37-m.m. Q.F.	..	1876	..	9·0	100	..
„	Madura (I) .		853	147	7	29	6	11	10	1	559	„	1 15-c.m., 3 12-c.m. (Krupp), 1 75-m.m., 2 37-m.m. Q.F.	..	1880	..	9·7	100	..
„	Padang (I). . .		853	147	7	29	6	11	10	1	409	„	1 15-c.m., 3 12-c.m. (Krupp), 1 75-m.m., 2 37-m.m. Q.F.	..	1878	..	9·4	100	..
„	Pelikaan (I) . .		400	158	0	26	3	10	5	..	485	steel	3 4·7-in. Q.F., 1 3-in. do., 2 3-pr. do. .	..	1891	..	11·35	..	..
„	Pontianak (I) . .		654	147	7	29	6	11	10	1	360	composite	1 16-c.m. 7-ton M.L.R. (Armstrong), 2 12-c.m. (Krupp). 1 75-m.m., 2 37-m.m. Q.F.	..	1873	..	8·5	85	..
„	Samarang (I) . .		853	147	7	29	6	11	10	1	460	iron & wood	1 18-c.m. 7-ton M.L.R. (Armstrong), 2 12-c.m. (Krupp), 1 75-m.m., 2 37-m.m. Q.F.	..	1876	..	9·0	100	..
„	Sambas (I) . . .		654	137	10	28	10	11	10	1	374	composite	1 18-c.m. 7-ton M.L.R. (Armstrong), 2 12-c.m. (Krupp), 1 75-m.m., 2 37-m.m. Q.F.	..	1874	..	8·5	85	.
sl.	Sommelsdijk .		1013	147	7	31	2	11	9	1	722	iron & wood	1 15-c.m., 3 12-c.m. (Krupp), 1 75-m.m., 2 37-m.m. Q.F., 2 M.	..	1882	..	10·0	95	..
cr.	Sumatra (I) .	P. 1½″	1700	216	6	36	9	14	0	2	3750	steel	1 21-c.m., 1 15-c.m., 2 12-c.m., 6 3-pdr. Q.F., 2 M.	2 f. tu. or l. car	1891	..	17·0	170	..
g.v.	Sumbawa (I) . .		600	158	0	26	3	10	5	..	950	steel	3 4·7-in., 1 75-m.m., 2 3-pdr. Q.F. . .	..	1891	..	12·5	..	..
„	New (I)		600	158	0	26	3	10	5	..	850	„	6 light guns	..	Bldg.	..	..	..	..
g.v.	Suriname . . .		853	147	7	29	6	11	10	1	440	„	1 15-c.m. (Krupp), 3 12-c.m., 1 75-m.m., 2 37-m.m. Q.F., 2 M.	..	1877	..	9·0	95	..
cr. 1st class	Tromp. . . .		3565	262	5	39	4	20	7	1	2772	„	6 17-c.m. 6-ton, 8 12-c.m. (Krupp), 2 75-m.m., 8 3-pdr. Q.F., 6 M.	..	1877	..	14·3	380	3000
corv.	Van Galen . . .		2160	193	6	41	6	18	2	1	833	wood	10 12-c.m. (Krupp), 2 75-m.m., 2 37-m.m. Q.F.	..	1872	..	10·0	400	..
cr. 1st class	Van Speyk . . .		3575	262	5	39	4	20	7	1	2891	iron & zinc sheathed	6 17-c.m. 6-ton, 8 12-c.m. (Krupp), 2 75-m.m., 8 3-pdr. Q.F., 6 M.	..	1882	..	14·2	380	3000
g.v.	Zwalur (I) . . .		340	123	0	21	0	10	0	1	320	composite	2 3-in., 2 2-in.	..	1882	..	10·5	..	..
cr.	Three New ships	P.	3900	306	0	48	6	17	8	2	..	steel	2 6-in. Q.F., 6 4·7-in. do., 4 75-m.m. do., 8 37-m.m. do.	4 f. tu. or l. car	Pro.	285,700	20 0	400 800	..

Sixteen Gunboats (*Staunch class*) of 263 tons, and of 100 to 171 H.P.; also *fourteen small gunboats*, of 210 tons, and 124 to 174 H.P., and *one steel gunboat* of 108 tons and 172 I.H.P. The new programme provides for the building of *fourteen gun vessels* of two different types for Home service.

NORWAY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Turret.	Armour. Belt.	Backing.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons.	
c.s., t.	Mjölner (iron)	1515	203 5	45 11	11 10	1	450	12	5	39	2 27-c.m. 18-ton M.L.R. (Armstrong), 3 M., 1 l.	..	1868	66,800	8·0	138	..
a.g.b.	New vessel (steel)	395	..	..	..	..	..	..	..	..	.. .. ..	..	Bldg.	..	..	..	..
c.s., t.	Skorpionen (iron)	1447	200 2	45 11	11 6	1	350	12	5	39	2 27-c.m. 18-ton M.L.R. (Armstrong), 3 M., 1 l.	..	1866	..	6·0	138	..
„	Thor (iron)	2003	203 5	49 3	13 2	1	600	14¼	7	38	2 27-c.m. 20-ton M.L.R. (Armstrong), 3 M., 1 l.	..	1872	..	8·0	200	..
„	Thrudvang (iron)	1515	200 2	45 11	11 10	1	500	12	5	39	2 27-c.m. 18-ton M.L.R. (Armstrong), 3 M., 1 l.	..	1867	..	8·0	138	..

Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.							£	knots.	tons.	
g.b.	Ægir	393	108 6	29 6	8 0	2	450	steel	1 21-cm., 1 7-c.m. Q.F., 2 5-c.m. do.	..	1892	..	9·0	..	..
g.v.	Ellida	1000	187 0	32 8	14 4	2	900	wood	5 15-c.m. 4-ton (Krupp), 1 12-c.m. do., 1 l., 2 M.	1 f. tu. or l. car	1880	..	12·0	97	..
„	Heimdal	630	167 3	26 9	11 8	..	700	steel	4 65-m.m. Q.F.	..	1892	..	12·0	22	..
to.g.b.	New	380	..	..	..	..	..	..	.. ..	..	Bldg.	33,000	..	..	..
corv.	Nord Stjernen	1609	216 6	39 4	17 9	1	800	wood	6 16-c.m. 3-ton M.L.R., 10 8-in. smooth-bore, 3 l.	..	1862	..	9·0	195	..
g.v.	Sleipner	580	173 10	25 11	9 6	2	800	iron	1 26-c.m. 22-ton (Krupp), 1 15-c.m. 4-ton do., 1 M.	1 f. tu. or l. car	1877	..	12·0	80	..
„	Viking P. 1½"	1113	203 6	30 6	13 0	2	2000	steel with belt of cellulose.	2 15-c.m., 4 65-m.m. Q.F., 4 37-m.m. do., 2 M.	3 l. car.	1891	..	15·0	..	..

Eleven Gunboats, of 189 to 280 tons, and of 180 to 450 I.HP., armed with one large gun and machine guns in each.
Sixteen smaller Gunboats, of 60 tons, 70 I.HP., and 7½ knots speed; each armed with one 5½-inch gun. Also several smaller gunboats

PORTUGAL.—Armoured Ship.

Class.	NAME.	Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Battery.	Backing. Deck Protection.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons.	
c.b.	**Vasco da Gama** (iron)	2422	200 0	40 0	18 0	2	3605	9	10	.. 3″	2 26-c.m. 18-ton (Krupp), 1 15-c.m. do., 2 65-m.m. Q.F., 2 M.	..	1876	103,800	13·2	300	..

For proposed new programme, see Chap. I., Progress of Foreign Navies, page 38.

Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	
corv.	**Affonso de Albuquerque**	1111	205 0	33 2	12 3	1	1055	iron & wood	2 6-in. (Armstrong), 5 5-in. do., 3 M.	..	1884	..	12·0	150	..
”	**Bartholomeu Dias**	2377	207 0	37 5	20 6	1	400 (nom.)	wood	8 5-in.	..	1858	..	10·0	360	..
g.v.	**Bengo**	462	125 7	24 7	8 10	1	400	composite	1 6-in., 2 87-m.m.	..	1879	..	10·0	80	..
”	**Diu**	640	147 0	27 0	13 0	1	700	”	1 15-c.m. (Krupp), 2 87-m.m. do., 1 3 pdr. Q.F., 2 M.	..	1889	..	12·0	..	..
”	**Dom Luiz I.**	600	..	..	..	2	..	steel	4 10½-c.m., 3 65-m.m. Q.F., 3 M.	..	1891	..	11·0	..	..
”	**New Ship**	600	..	..	..	2	..	”	4 10½-c.m., 3 65-m.m. Q.F., 3 M.	..	Bldg.	..	11·0	..	..
”	**Douro**	587	143 0	25 11	10 10	1	400	wood	1 15-c.m. 4-ton, 2 5-in. do., 1 M.	..	1873	..	9·0	80	..

PORTUGAL.—Unarmoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Dischargers for Torpedoes.	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	knots.
corv.	Duque de Terceira	1418	180 2	34 2	14 9	1	220 (nom.)	wood	2 15-c.m. (Krupp), 2 65-m.m. Q.F., 2 M.	..	1864	..	10·0	200	..
"	Estephania	2368	202 5	41 4	17 8	1	400 (nom.)	"	1 7-in., 8 80-pdr. M.L. (Palliser)	..	1859	..	10·0	360	..
g.v.	Liberal	610	140 0	25 10	11 0	1	500	iron & wood	1 6-in. 4-ton (Armstrong), 2 4-in. do., 2 M.	..	1884	..	10·0	90	..
corv.	Mindello	1124	169 11	35 9	13 5	1	900	composite	2 7-in. 4-ton M.L.R. (Armstrong), 6 5-in. 2 l.	..	1876	..	11·0	100	..
g.v.	Mandovi	462	125 7	24 7	8 10	1	400	"	1 6-in., 2 9-c.m., 2 M.	..	1879	..	10·0	80	..
"	Quanza	587	143 0	25 11	10 10	1	500	wood	1 6-in. 4-ton, 2 5-in., 1 M.	..	1877	..	10·0	80	..
corv.	Rainha de Portugal	1124	169 11	35 9	13 5	1	900	composite	1 7-in. M.L.R. (Armstrong), 4 5-in., 2 l.	..	1876	..	11·0	100	..
g.v.	Rio Ave	380	120 0	22 0	10 0	1	300	wood	1 10 c.m., 2 7½-c.m. do.	..	1880	..	8·0	65	..
"	Rio Lima	610	148 11	28 3	10 6	1	500	iron & wood	1 15-c.m. 4-ton (Armstrong), 4 40-pdr. do	..	1875	..	10·0	90	..
"	Sado	610	148 11	28 3	10 6	1	500	composite	1 15-c.m. 4-ton (Armstrong), 4 40-pdr. do	..	1875	..	10·0	90	..
"	Tamega	610	148 11	28 3	10 6	1	500	"	1 15-c.m. 4-ton (Armstrong), 4 40-pdr. do.	..	1875	..	10·0	90	..
"	Tejo	587	143 0	25 11	10 10	1	400	wood	1 15-c.m. 4-ton, 2 40-pdr. do.	..	1869	..	10·0	80	..
"	Vouga	721	161 0	27 7	11 10	1	600	iron & wood	1 6-in., 4 4-in. do., 2 M.	..	1882	..	9·0	100	..
"	Zaire	558	140 0	25 10	11 10	1	500	"	1 6-in. (Armstrong), 2 4-in. do., 2 M.	..	1884	..	10·0	20	..
"	Zambezia	640	143 0	26 0	10 10	1	500	composite	1 6-in., 2 4-in. do., 2 M.	..	1886	..	9·0	80	..
cr.	4 Cruisers (not named) P. 2¾"	4700	334 9	46 9	20 0	2	11,000	steel	4 15-c.m., 4 65-m.m. Q.F., 4 M.	1. car.	Projctd.	..	21·0	850	5000

Five small Gunboats (station) of 159 to 340 tons displacement, and 11 to 12 knots speed.

RUSSIA.—Armoured Ships.

(B.S., Black Sea Fleet.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Turret or Battery.	Backing. Deck Plating.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	ins.				£	knots.	tons.	knots.
c.d.s., t.	Adm. Chichagoff (iron)	3511	254 0	42 7	18 0	1	2060	6	6	17½	2 11-in. 28-ton, 6 Q.F., 4 l. .	..	1868	..	10·5	300	..
”	Adm. Greig. (iron)	3593	254 0	42 7	17 6	1	2031	4½	6	17½	3 11-in. 28-ton, 6 Q.F., 2 l. .	..	1868	..	10·0	300	..
”	Adm. Lazareff (iron)	3556	254 0	43 0	17 6	1	2004	4½	6	17½	3 11-in. 28-ton, 6 Q.F., 4 l. .	..	1867	..	10·25	300	..
a.c.	Admiral Nachimoff (steel, cop. shd.)	7782	333 0	61 0	25 0	2	8000	10 comp.	8 barbette comp.	.. 3″	8 8-in., 10 6-in., 10 Q.F., 4 3-pdr. do., 6 M.	4 f. tu. or l.car	1885	572,000	16·7	1200	..
c.d.s.	Admiral Outshakoff .	4126	278 9	52 6	17 0	2	5000	10	..	.. 3″	2 9-in., 4 6-in., & 6 47-m.m. Q.F., 8 M.	4 f. tu. or l.car	1893	410,000	16·0	400	.
”	Admiral Senjavin .	4126	278 9	52 6	17 0	2	4250	10	..	.. 3″	2 9-in., 4 6-in. Q.F., 6 47-m.m. do., 8 37-m.m. M.	4 f. tu. or l. car	1894	410,000	16·0	400	..
c.d.s., t.	Adm. Spiridoff (iron)	3500	254 3	42 7	19 1	1	2007	6	6	17½	2 11-in. 28-ton, 6 Q.F., 4 l. .	..	1868	..	10·5	300	..
b.	Alexander II. (steel, cop. shd.)	8440	326 0	67 0	23 0	2	8000	14 comp.	10 barbette comp. battery 4-inch.	.. 2½″	2 12-in. 50-ton, 4 9-in. 19-ton, 8 6-in., 4 6-pdr. Q.F., 4 3-pdr. do., 6 M.	5 f. tu. or l.car	1887	..	16·5	..	..
c.d.s., t.	Bronenosetz . (iron)	1482	200 0	45 11	11 6	1	481	5 1-in. plates	11 1-in. plates	.. 1″	2 9-in., 4 Q.F. and M. . .	..	1864	..	7·0	..	..
b. 1st class	Catherine II. B.S. (iron and steel)	10,180	331 0	69 0	26 6	2	11,000	16 comp.	14 barbette comp.	12 3″	6 12-in. (56-ton), 7 6-in., 8 6-pdr. Q.F., 6 M.	7 f. tu. or l.car	1886	900,000	15·5	886	1350 at 14 knots
c.d.s., t.	Charodeika (iron)	2026	206 9	42 7	10 6	2	700	4½	6 turret	17½ 1″	4 9-in., 2 Q.F. and 2 M. .	..	1867	..	8·0	250	..
b.	Cizoi Veliky (No. 1) .	8880	341 0	66 6	24 0	2	8500	15¾ comp. 5 above	15¾ comp.	..	4 12-in., 6 6-in., 12 47-mm. Q.F., 4 37-m.m. do., 2 M.	6 f. tu. or l car	1894	796,333	16·0	550 880	..
b.	Cizoi Veliky (No. 3) .	8880	341 0	66 6	24 0	2	8500	15¾ comp. 5 above	15¾ comp.	..	.. .. ..	..	Bldg.	..	16·0	..	..
a.c.	Dimitri Donskoi (steel, cop. shd.)	5893	296 5	52 0	24 4	2	7000	6	unarmoured	.. 2½″	2 8-in., 12 6-in., 16 Q.F. and M., 4 l.	4 f. tu. or l.car	1883	..	16·5	400	4800

RUSSIA.—Armoured Ships—*continued.*

(B.S., Black Sea Fleet.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Turret or Battery.	Backing. Deck Plating.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	ins.				£	knots.	tons.	knots.
t.	Dvenadsat Apostoloff (Twelve Apostles)	8076	330 0	60 0	25 6	2	11,500	14 comp.	12 (conning tower 5 ins.) comp.	.. 2½″	4 12-in. 52-ton, 4 6-in., 8 3-pdr. Q.F., 10 M.	6 f. tu. or l.car	1890	..	16·6	..	..
c. d.s., t.	Edinorog . (iron)	1407	201 0	46 0	11 6	1	460	5 1-in. plates	11 1-in. plates	39 1″	2 9-in. 15-ton, 2 Q.F. and 2 M.	..	1864	..	7·0	..	..
t.	Gangoot . (steel)	6592	278 0	62 0	21 0	2	8300	partial belt 16 comp.	armoured casemate	..	1 12-in., 4 9-in., 4 6-in., 10 Q.F.	5 f. tu. or l.car	1890	..	14·7	..	..
a.c.	General Admiral (iron, copper sheathed)	4604	285 5	49 3	21 0	1	4472	6	unarmoured	9¾	6 8-in., 2 6-in., 10 Q.F. and M., 5 l.	2 f. tu. or l.car	1873	..	14·2	1000	..
c.d.s.	General Admiral Apraxine	4126	278 9	52 6	17 0	2	5000	10	..	.. 3″	2 9-in., 4 6-in., 6 47-m.m. Q.F., 8 37-m.m.	4 f. tu. or l.car	Bldg.	..	16·0	400	..
a.c.	Gerzog Edinburgski (iron and wood)	4604	285 5	49 3	21 0	1	5222	6	unarmoured	9¾	4 8-in., 5 6-in., 12 Q.F., 6 l. .	2 f. tu. or l.car	1875	..	15·2	1000	..
b.	Gheorghy Pobyedo-nosets (steel)	10,280	320 0	69 0	26 7	2	10600 ?16000 F.D.	16—8 steel	12 steel bulkhds. 10—9	..	6 12-in. 56-ton, 7 6-in., 8 10-c.m. Q.F., 6 M.	7 f. tu. or l.car	1892	431,000	16·5	700	..
a.g.b.	Gremyastchy, Sib. .	1500	225 0	41 0	11 0	2	2000	5	..	.. 1½″	1 9-in., 1 6-in., 10 Q.F. .	2 f. tu. or l.car	1892	..	15·0	..	..
"	Grozyashtchy (steel)	1492	229 0	41 8	11 0	2	2000	5	..	.. 1½″	1 9-in., 1 6-in., 8 Q.F. . .	2 f. tu. or l.car	1890	..	15·0	..	..
c.b.	Kniaz Pojarski (iron)	5007	272 4	49 3	23 11	1	2835	4½—3½	4½	..	2 8-in., 2 6-in., 10 Q.F. and M., 4 l.	..	1867	..	11·0	600	..
c.d.s.,br.	Kreml . . .(iron)	3480	219 10	52 5	15 0	1	2822	4½	4½	17½	8 8-in., 6 6-in., 5 Q.F., 6 l. .	..	1864	..	9·0	..	..
a.c. 1st class	Minin . . .(iron)	5740	298 6	49 3	25 3	1	5290	7	..	..	4 8-in., 12 6-in., 16 Q.F., 4 l.	..	1878 altered	..	14·0	..	..

c.d.s.,br.	Netron-Menya .(iron)	3494	219	10	53	0	15	6	1	2393	4½	4½ battery	9¾	14 8-in., 4 Q.F., 2 M., 4 l.	1 l. car.	1864	..	9·0	500	..
t.	Navarin . (steel)	9476	338	0	67	0	25	0	2	9000	16	12 barbettes	..	4 12-in. 52-ton, 8 6-in., 14 Q.F. 4 l.	6 f. tu. or l. car	1891	772,995	16·0	700	..
t.	Nicolai I. (steel, copper sheathed)	8440	326	0	67	0	23	0	2	8000	14 comp.	10 turret 6-in. battery comp.	.. 2½″	2 12-in. 52-ton, 4 9-in. 19-ton, 8 6-in., 12 Q.F., 8 M., 4 l.	6 f. tu. or l.car	1888	453,000	14·8	..	..
circular c.d.s.	Novgorod, B.S. (iron, copper sheathed)	2706	101	0	101	0	13	0	6	2000	9—7	9	*	2 11-in., 8 Q.F., 2 M., 2 l.	..	1873	..	6·0	200	..
a.g.b.	Otvazny, Sib.	1500	225	0	41	0	11	0	2	2000 2589 (t)	5	..	.. 1½″	1 9-in., 1 6-in., 10 Q.F.	2 f. tu. or l.car	1892	..	15·0 15.5 (t)		..
a.c. 1st class	Pamyat Azova, Sib. (steel, wood sheathed)	6000	377	0	51	0	23	0	2	8000	9 comp.	8 barbette comp.	10 2½″	2 8-in., 13 6-in., 14 Q.F., and 3 M.	7 f. tu. or l.car	1888	350,000	18·8	1000	12,000
c.d.s.,br.	Pervenetz . .(iron)	3279	219	10	52	5	14	9	1	1067	4½	4½	9¾	6 8-in., 9 6-in., 7 Q.F., 8 l.	..	1863	..	9·0	..	..
t.	Peter the Great .(iron)	8749	328	2	62	4	23	9	2	8258	14—8	8—6 turret	9¾ 3″	4 12-in. 40-ton, 13 Q.F., 4 l.	1 f. tu. or l.car	1872	..	14·5	1200	..
t.	Petropaulowski (steel)	10,960	367	6	69 70	0 0	26	0	2	10600	15¾	10 H. S. 4¾ small turrets.	.. 3½″	4 12-in., 8 8-in., 24 Q.F.	6 f. tu. or l.car	1894	1,098,000	17 5	..	..
t.	Poltava . (steel)	10,960	367	6	69	0	26	0	2	10600	15¾	10 H. S. 4¾ small turrets.	.. 3½″	4 12-in., 8 8-in., 24 Q.F.	6 f. tu. or l.car	1894	1,098,000	17·5	..	..
a.c.	Rossia . . (steel)	12,130	480	0	68	6	25	0	3	15000	..	..	..	4 8-in., 16 6-in., 6 4·7-in. Q.F., 18 small Q.F. & M.	5 f. tu. or l.car	Bldg.	..	20·0	2500	..
t.	Rostislav . . .	8880	341	0	66	6	24	0	2	8500	15¾ 5 above comp.	15¾ comp.	..	4 10-in., 8 15-c.m. (Canet), 12 47-m.m. Q.F., 4 37-m.m. do., 2 M.	6 f. tu. or l.car	Bldg.	..	16·0	550 800	..
a.c.	Rurik . . (steel)	10,923	396	6	67	0	26	0	2	13250	10 comp.	..	.. 2½″	4 8-in., 16 6-in., 6 4·7-in. Q.F., 18 small Q.F. & M.	5 f. tu. or l.car	1894	..	18·0	2000	20,000

* Hughes' Backing. (t) On trial.

RUSSIA.—Armoured Ships—*continued.*

(B.S., Black Sea Fleet.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Turret or Battery.	Backing. Deck Plating.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	ins.				£	knots.	tons.	knots.
t.	Sevastopol . (steel)	10,960	367 6	69 0	26 0	2	13600	15¾	10 4¾ small turrets.	..	4 12-inch, 8 8-inch, 24 Q.F. .	6 f. tu. or l.car	Bldg.	1,098,000	17·5	..	..
b.	Sinope, B.S. (iron & steel)	10,180	331 0	69 0	26 6	2	13000	16 comp.	14 comp.	12 3″	6 12-in. 50-ton, 7 6-in. 8 Q.F., 6 M.	7 f. tu. or l.car	1887	900,000	16·75	886	1350 at 14 kts.
b.	Tchesmé, B.S. (iron & steel)	10,180	331 0	69 0	26 6	2	11000	16 comp.	14 comp.	12 3″	6 12-in. 50 ton, 7 6-in., 8 Q.F., 6 M.	7 f. tu. or l.car	1886	900,000	15·0	886	1350 at 14 kts.
”	Tria Sviatitelia . . (Three Saints.)	12,480	357 6	72 2	27 0	2	10600	18—16 5-in. topsides	16 5 upper.	.. 3″	4 12-inch, 12 6-inch Q.F., 4 4¾-inch do., 56 smaller Q.F. & M.	6 f. tu or l.car (2 sub.)	1893	..	16·0	1000	4000
circular c.d.s.	Vice-Admiral Popoff, (iron, cop. shd.) B.S.	3590	120 0	120 0	13 5	6	3066	16	16	9	2 12-in. 40-ton, 2 Q.F., 6 l. .	..	1875	..	8·0	250	..
a.c.	Vladimir Monomach (steel, cop. shd.) Sib.	5796	296 6	52 0	24 0	2	7000	6 comp.	unarmoured	.. 2″	4 8-in., 12 6-in., 18 Q.F. & M., 4 l.	2 f. tu. or l.car	1882	..	15·2	400	..

Ten old Monitors have been removed from this list.

RUSSIA.—Unarmoured Ships.

(Bal., Baltic Fleet; B.S., Black Sea Fleet; Sib., Siberian Squadron.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.							£	knots.	tons.	knots.
cr. 2nd class	Admiral Korniloff, Bal. P. (Is receiving new boilers) 2″	5000	351 0	48 6	20 0	2	9000	steel & wood sheathed	2 8-in., 14 6-in., 6 47-m.m. Q.F., 6 37-m.m. do., 5 l.	6 f. tu. or l. car	1887	296,000	17·5	..	..
cr. 3rd class	Afrika, Bal.	2852	285 5	39 4	17 1	1	1350	iron	3 6-in., 6 Q.F., 4 M., 4 l.	..	1877	..	13·0	..	..
cr. 3rd class	Asia, Bal.	2483	269 0	36 0	16 5	1	1100	iron	2 6-in., 5 Q.F., 6 M., 5 l.	..	1878	..	13·0	..	..
g.v.	Bobr, Sib.	950	187 0	35 2	9 6	2	1150	steel	1 9-in., 1 6-in., 5 Q.F., M., & 6 l.	..	1884	43,000	12·0	..	..
to.g.b.	Captain Sacken, B.S.	700	210 0	24 0	8 10	2	3400	,,	7 4·7-in. Q.F., 7 M.	6 l. car.	1888	40,700	18·5	..	..
g.v.	Chernomoretz, B.S.	1224	210 0	35 0	11 1	1	2000	,,	2 8-in., 1 6-in., 7 Q.F. & M.	2 f. tu. or l. car	1889	40,000	13·5	..	..
,,	Coreetz, Sib.	1213	206 0	35 0	10 6	2	1500	,,	2 8-in., 1 6-in., 2 Q.F., 4 l.	2 f. tu. or l. car	1886	..	13·5	..	..
corv.	Djigit, Bal.	1456	206 9	32 10	16 1	1	1700	iron & wood	3 6-in., 8 Q.F. & M., & 4 l.	..	1876	..	13·0	..	..
,,	Donetz, B.S.	1224	210 0	35 0	11 0	1	2000	steel	2 8-in., 1 6-in., 7 Q.F. & M.	2 f. tu. or l. car	1887	40,000	13·5	..	..
to.g.b.	Gaidamak, Sib.	500	192 6	24 2	7 6	2	3000	,,	2 47-m.m. Q.F., 7 37-m.m. do., 10 M.	3 l. car	1893	..	22·0	..	..
to.g.b.	Griden, B.S.	400	192 6	24 2	7 6	2	3500	,,	2 47-m.m. Q.F., 7 37-m.m. do., 10 M.	3 l. car	1893	66,600	22 0	..	..
g.v.	Jermak, Sib.	706	154 3	26 3	11 2	1	125	,,	2 guns	..	1870	..	..	..	..
to.g.b.	Kazarsky, B.S.	411	190 0	24 0	8 6	2	3400	,,	9 47-m.m. Q.F. (Hotchkiss)	2 l. car.	1890	32,500	21·0	90	4000
corv.	Kreyzer, Sib.	1542	206 9	32 10	16 1	1	1800	iron & wood	2 6-in., 7 Q.F., 1 M., 4 l.	..	1875	..	13·0	..	..
g.v.	Kubanetz, B.S.	1224	210 0	35 0	11 0	1	1500	steel	2 8-in., 1 6-in. do., 7 Q.F.	2 f. tu. or l. car	1888	40,000	13·8	..	..
to.g.b.	Lieutenant Ilyn, Bal.	600	230 0	24 0	8 10	2	3500	,,	7 3-pdr. Q.F., 10 M.	7 f. tu. or l. car	1887	40,150	20·1	97	..
g.v.	Mandjur, Bal.	1224	210 0	35 0	11 0	2	1400	,,	2 8-in., 1 6-in. do., 7 Q.F., M., & 4 l.	2 f. tu. or l. car	1886	..	14·0	..	..
corv.	Nayezdnik, Bal.	1334	206 9	32 10	14 0	1	1719	iron & wood	3 6-in., 7 Q.F. & M., 4 l.	..	1878	..	13·0	..	..

RUSSIA.—Unarmoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.							£	knots.	tons.	knots.
corv.	Oprichnik, Bal.	1426	206 9	32 10	14 0	1	1268	steel & wood	3 6-in., 7 Q.F. & M., 4 l.	..	1880	..	13·0	..	..
cr. 2nd class	Pamyat Merkuriya, B.S.	3050	295 0	41 0	17 0	1	3000	iron & steel	6 6-in., 8 Q.F. & M., 4 l.	2 f. tu. or l.car.	1880	..	16·0	..	..
d.v.	Penderaklia, B.S.	1052	190 3	29 6	12 8	1	568	iron	3 guns	..	1877	..	..	..	..
sl.	Plastun, Bal.	1255	206 9	32 10	14 0	1	1268	iron & wood	3 6-in., 7 Q.F. & M., & 4 l.	..	1879	..	13·0	..	..
to.g.b.	Posadnik, Bal.	400	192 6	24 2	7 6	2	3000	steel	2 47-m.m. Q.F., 7 37-m.m. do., 3 M.	3 f. tu. or l.car	1892	111,000	22·0	..	..
cr.	New ship	9000	..	..	..	..	..	..	.. ..	..	Proj.	..	..	..	..
corv.	Razboynik, Sib.	1329	206 9	32 10	14 0	1	1786	iron & wood	3 6-in., 7 Q.F. & M., & 4 l.	..	1878	125,000	13·0	..	..
cr. 3rd class	Rynda, Sib. P. 1½"	2950	265 9	45 11	16 1	2	3000	steel & wood sheathed.	10 6-in., 9 Q.F., M., & 4 l.	4 f. tu. or l.car	1885	..	14·8	710	2400
g.v.	Sivootch, Sib.	950	187 0	35 0	9 6	2	1125	steel	1 9-in., 1 6-in., 5 Q.F., M., & 6 l.	..	1884	43,000	12·5	..	..
corv.	Strjelok, Bal.	1343	206 9	32 10	14 0	1	1528	iron & wood	3 6-in., 7 Q.F., M., & 4 l.	..	1880	..	13·0	..	..
g.v.	Teretz, B.S.	1224	210 0	35 0	11 0	..	1500	steel	2 8-in., 1 6-in. do., 7 Q.F. & M.	2 f. tu. or l.car	1888	40,000	13·8	..	..
"	Tunguz, Sib.	706	154 3	26 3	11 2	1	130	iron	4 guns	..	1870	..	..	..	..
"	Uraletz, B.S.	1224	210 0	35 0	11 0	..	1500	steel	2 8-in., 1 6-in. do., 7 Q.F. & M.	2 f. tu. or l.car	1888	40,000	13·8	..	..
to.g.b.	Voevada	400	192 6	24 2	7 6	2	3000	steel	2 47-m.m. Q.F., 7 37-m.m. do., 3 M.	3 f. tu. or l.car	1892	111,000	22·0	..	2500 at 14 knots
sl.	Vjestnik, Bal.	1255	206 9	32 10	14 2	1	1268	iron & wood sheathed.	3 6-in., 7 Q.F. & M., & 4 l.	..	1879	..	13·0	..	..
to.g.b.	Vzadnidk, Sib.	500	192 6	24 2	7 6	2	3000	steel	4 47-m.m. Q.F., 7 37-m.m. do., 10 M., & 1	3 car.	1893	..	22·0	..	..
sl.	Zabiyaka, Sib.	1234	219 10	29 6	14 9	1	1194	iron	6 Q.F., 4 M., 5 l.	..	1878	..	14·5	..	..
g.v.	Zaporojetz, B.S.	1200	210 0	35 0	10 0	2	1500	steel	2 8-in., 1 6-in., 7 Q.F. & M.	2 f. tu. or l.car	1887	40,000	13·5	..	..

Ten Gunboats, Staunch Class (Baltic Fleet), of 270 to 402 tons, 195 to 445 I.H.P., with 1 11-inch breech-loader, and 9 knots speed, and *two Gunboats (Baltic Fleet)* of about 180 tons and 7 knots speed.

Twelve Steamers (Gun-vessels, Despatch-vessels, &c.) (Black Sea Fleet) 90 to 298 tons.

Auxiliary Steamers.

Class.	NAME.	Material built of.	Where built.	When built.	Length.	Breadth.	Draught of Water.	Displacement.	Horse-power of Engines.	No. of Screws.	Speed in Knots.
	BLACK SEA CO.				ft. in.	ft. in.	ft. in.	tons.			
Auxiliary Cruiser	Czar	steel	Newcastle	1883	319 0	37 0	23 6	2240	350 nom.	1	14
,,	Czarevna	,,	,,	1883	319 0	37 0	23 6	2240	350 nom.	1	14
,,	Czaritza	,,	,,	1883	319 0	37 0	23 6	2240	350 nom.	1	14
,,	Grand Duke Alexis	,,	Hebburn	1890	284 0	37 0	14 9	2350	3500	1	16
,,	Grand Duke Constantine	,,	,,	1891	284 0	37 0	15 0	2400	3500	1	16
,,	Grand Duke No. 1	,,	,,	Bldg.	288 0	37 0	15 0	2400	2500	1	14½
,,	Grand Duke No. 2	,,	,,	,,	288 0	37 0	15 0	2400	2500	1	14½
,,	Roumantzeff	,,	,,	1894	212 0	28 0	7 6	760	1000	2	13
	VOLUNTEER FLEET.										
,,	Khabaravsk	,,	,,	1894	265 0	36 0	14 6	2700	1800	2	13
,,	Kherson	,,	,,	Bldg.	493 0	54 0	24 0	10,255	12,500	2	19½
,,	Kostroma	,,	,,	1888	360 0	42 0	23 6	6830	2700	1	14
,,	Moskva (was Kinfauns Castle)	,,	Glasgow	1879	360 0	43 0	24 0	3050	2730	1	14
,,	Orel	,,	Hebburn	1889	445 0	48 0	23 6	7650	10,000	2	19
,,	Petersburg	,,	,,	1894	460 0	52 0	24 0	9250	11,000	2	19
,,	Russia (was Holsatia)	iron	,,	1868	341 0	40 0	21 0	3100	2200	1	14
,,	Saratoff	steel	,,	1892	460 0	50 0	24 0	8750	10,000	2	19
,,	Tamboff	,,	Dumbarton	1893	385 0	45 0	24 6	4360	..	2	12¾
,,	Vladimir	,,	Dumbarton	Bldg.	419 0	49 6	24 0	..	..	2	12
,,	Yaraslav	,,	Dumbarton	1893	335 0	45 0	24 6	4321	..	2	12¾

SPAIN.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Battery or Barbette	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dischargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons.	knots.
a.c.b.	Almirante Oquendo (steel)	7000	340 0	65 0	21 6	2	13,000	12	10½ 12 C. T.	.. 3″–2″	2 28-c.m., 10 14-c.m. (all Hontoria), 8 57-m.m. Q.F., 8 37-m.m. do., 2 M.	6 f. tu. or l.car	1891	600,000	20·0	..	..
”	Cardenal Cisneros (steel)	6648*	347 10	61 0	21 10	2	15,000	12	10½ 12 C. T.	.. 2″	2 28-c.m., 10 14-c.m. Q.F., 2 7-c.m. do., 4 57-m.m. do., 4 37-m.m. do., 2 M.	8 f. tu. or l.car	Bldg.	600,000	20·0	..	..
”	Cataluña (steel)	6648*	347 10	61 0	21 10	2	15,000	12	10½ 12 C. T.	.. 2″	2 28-c.m., 10 14-c.m. Q.F., 2 7-c.m. do., 4 57-m.m. do., 4 37-m.m. do., 2 M.	8 f. tu. or l.car	Bldg.	600,000	20·0	..	..
a.c.t.	Emperador Carlos V. (steel)	9090	380 0	67 0	25 0	2	18,500	2 sides	10 turret	.. 6⅛″	2 28-c.m. (Hontoria), 8 14-c.m. Q.F., 4 10-c.m. do., 2 7-c.m. do., 4 57-m.m. do., and 4 37-m.m. do., 2 M.	6 f. tu. or l.car	1895	734,000	20·0	17·70	13,000
a.c.b.	Infanta Maria Teresa (steel)	7000	340 0	65 0	21 6	2	13,758	12	10½ 12 C. T.	.. 3″–2″	2 28-c.m., 10 14-c.m. (all Hontoria), 8 57-m.m. Q.F., 8 37-m.m. do., 2 M.	6 f. tu. or l.car	1890	600,000	20·25	..	..
br.	Numancia (*a*) (iron)	7305	314 10	55 9	25 3	1	3708	5½	5	12	8 10-in. M.L.R. (Armstrong), 7 8-in. do., 1 20-c.m. (Hontoria), 8 M., 3 l.	2 f. tu. or l.car	1863	315,600	8·0	740	2450
b.	Pelayo . (steel)	9900	330 0	66 0	24 11	2	8000	17¾	19¼	.. 4″	2 32-c.m. 48-ton, 2 28-c.m. 38-ton, 1 16-c.m., 12 12-c.m., 6 Q.F., 12 M.	7 f. tu. or l.car	1887	..	16·0	700	..
a.c.b.	Princesa de Asturias (steel)	6648*	347 10	61 0	21 10	2	15,000	12	10½ 12 C. T.	.. 2″	2 28-c.m., 10 14-c.m. Q.F., 2 7-c.m. do., 4 57-m.m. do., 4 37-m.m. do., 2 M.	8 f. tu. or l.car	Bldg.	600,000	20·0	..	..

c.s., t.	Puig-cerda (iron Monitor)	553	127 11	29 6	6 7	2	328	4	4	9	1 16-c.m. (Palliser), 2 12-c.m. bronze smooth-bores.	..	1874	..	8·0	23	..
a.c.b.	Vizcaya . . .	7000	340 0	65 0	21 6	2	13,000	12	10½ 12 C.T.	.. 3"–2"	2 28-c.m., 10 14-c.m. Q.F., 2 97-m.m. do., 8 57-m.m. do., 4 37-m.m. do., 2 M.	6 f. tu. or l.car	1891	600,000	20 0 21.0 (*t*)	..	..
b.r.	Vitoria (iron)	7250	318 3	55 10	25 3	1	4500	5½	5	12	8 9-in. M.L.R. (Armstrong), 3 8-in. do., 1 20-c.m. (Hontoria), 8 M., 2 l.	2 f. tu. or l.car	1865	..	11·0	900	..

* English tons.

Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	
cr.	Alfonso XII. (*a*) . .	3090	278 10	42 7	16 5	1	4800	steel	6 16-c.m. (Hontoria), 2 7-c.m. do., 6 6-pdr. Q.F., 4 3-pdr. do., 5 M.	5 f. tu. or l.car	1887	..	17·5	600	..
„	Alfonso XIII. . . P. 4¾"–3"	5000	318 6	50 6	20 0	2	11,000	„	4 20-c.m. (Hontoria), 6 12-c.m. do., 6 57-m.m. Q.F., 6 37-m.m. do., 3 M.	5 f. tu. or l.car	1891	..	20·0	1100	..
„	Aragon	3342	246 0	45 11	20 11	1	4400	wood	6 16-c.m. (Hontoria), 2 87-m.m. (Krupp), 4 75-m.m. do., 2 M.	2 l. car.	1879	..	14·0	470	..
„	Castilla	3342	246 0	45 11	20 11	1	4400	„	4 15-c.m. (Krupp), 2 12-c.m. do., 2 87-m.m. do., 4 7½-c.m. do., 8 Q.F., 2 M.	2 l. car	1881	..	14·0	470	..
„	Concha	524	157 5	25 7	8 7	2	600	iron	3 12-c.m. (Hontoria), 2 Q.F., 1 M. . .	1 l. car	1883	..	11·5	80	..
„	Conde de Venadito . .	1130	210 0	32 0	12 6	1	1600	„	4 12-c.m. (Hontoria), 2 7-c.m. do., 2 Q.F., 5 M.	2 f. tu. or l.car	1888	..	14·0	220	..
„	Cristobal Colon . .	1130	210 0	32 0	12 6	1	1600	„	4 12-c.m. (Hontoria), 1 7-c.m. do., 2 Q.F., 5 M.	2 f. tu. or l.car	1887	..	14·0	220	..

(*a*) To be used as a Transport. (*t*) On trial.

SPAIN.—Unarmoured Ships—*continued.*

Class.	NAME.		Displacement.	Length.		Beam.		Draught of Water.		Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
			tons.	ft.	in.	ft.	in.	ft.	in.							£	knots.	tons.	knots.
cr.	Don Antonio Ulloa		1130	210	0	32	0	12	6	1	1600	iron	4 12-c.m. (Hontoria), 2 7-c.m. do., 2 Q.F., 5 M.	2 f. tu. or l.car	1887	..	14·00	220	..
”	Don Juan de Austria		1130	210	0	32	0	12	6	1	1600	”	4 12-c.m. (Hontoria), 3 57-m.m. Q.F., 2 42-m.m. do., 5 M.	3 f. tu. or l.car	1887	..	14·00	..	..
to.g.b.	Destructor		458	192	6	25	0	mean dt. 7	0	2	3800	steel	1 9-c.m., 4 6-pr. Q.F., 4 M.	3 f. tu. or l.car	1887	..	22·56	..	5500
g.v.	El Cano		524	157	5	25	7	8	6	2	600	iron	3 12-c.m. (Hontoria), 2 Q.F., 2 M.	1 l. car	1885	..	11·50	80	..
cr.	Ensenada	pp. 2½″-1″	1030	185	0	30	0	11	6	2	1600	steel	4 12-c.m. (Hontoria), 5 Q.F., 4 M.	3 f. tu. 1 l. car	1890	..	15·00	..	..
d.v.	Fernando el Catolico		500	157	5	25	7	8	5	2	550	iron	1 16-c.m. M.L.R. (Palliser), 2 12-c.m. smooth-bores, 1 M.	..	1875	..	10·00	20	..
to.g.b.	Filipinas		750	213	0	27	0	8	6	2	4600	steel	2 12-c.m. Q.F., 4 42-m.m. do., 4 M.	4 f. tu. or l.car	1892	..	20·00	..	2600
”	Galicia		571	190	0	23	0	10	4	2	2600	”	2 12-c.m. (Hontoria), 4 57-m.m. Q.F., 1 M.	2 l.car.	1891	..	19·00	106	..
g.v.	General Lezo		524	157	5	25	7	8	6	2	600	iron	2 12-c.m. (Hontoria), 1 9-c.m. do., 2 Q.F., 1 M.	2 l. car	1885	..	11·00	80	..
cr.	Infanta Isabel		1130	210	11	32	2	12	5	1	1500	”	4 12-c.m. (Hontoria), 2 7-c.m. do., 3 Q.F., 4 M.	2 l. car	1885	..	14·00	220	..
”	Isabel II.		1130	210	11	32	2	12	5	1	1500	”	4 12-c.m. (Hontoria), 2 7-c.m. do., 4 Q.F., 3 M.	2 l. car	1886	..	14·00	220	..
”	Isla de Cuba	pp. 2½″-1″	1030	185	0	30	0	11	6	2	2200	steel	4 12-c.m. (Hontoria), 4 6-pdr. Q.F., 2 3-pdr. do., 2 M.	3 f. tu. or l.car	1887	..	16·00	160	..
”	Isla de Luzon	pp. 2½″-1″	1030	185	0	30	0	11	6	2	2200	”	4 12-c.m. (Hontoria), 4 6-pdr. Q.F., 2 3-pdr. do., 2 M.	3 f. tu. or l.car	1887	..	16·00	160	..
sl.	Jorge Juan		935	203	5	29	6	12	2	1	1100	wood	3 12-c.m. (Hontoria), 2 73-m.m. (Krupp), 2 M.	..	1876	..	13·00	130	..
cr.	Lepanto	P. 4¾″-3″	4826	318	6	50	6	20	0	2	12,000	steel	4 20-c.m. (Hontoria), 6 12-c.m. Q.F., 6 6-pdr. do., 4 3-pdr. do., 5 M.	5 f. tu. or l.car	1892	..	20·00	1100	..

g.v.	Magellanes . . .		524	157	5	25	7	8	6	2	600	iron	3 12-c.m. (Hontoria), 3 M. . . .	1 l. car	1885	..	11·0	80	..
d.v.	Marques del Duero . .		500	157	5	25	7	8	5	2	550	"	1 16-c.m. M.L.R. (Palliser), 2 12-c.m. smooth-bores, 1 M.	..	1875	..	10·0	90	..
to.g.b.	Marques de Molins . .		571	190	0	23	0	10	4	2	2600	steel	2 12-c.m. (Hontoria), 4 57-m.m. Q.F., 1 M.	2 l. car	1891	..	19·0	106	..
"	Martin Alonzo Pinzon .		571	190	0	23	0	10	4	2	2600	"	2 12-c.m. (Hontoria), 4 57-m.m. Q.F., 1 M.	2 l. car	1892	..	19·0	106	..
cr.	Navarra		3342	232	11	42	7	20	4	1	4400	wood	4 15-c.m. 2 12-c.m., 2 87-m.m., 4 75-m.m., 4 M.	2 l. car	1881	..	14·0	470	..
to.g.b.	New (B, C, D) (a) . . .		850	..		..		..		2	4500	steel	2 12-c.m. Q.F., 4 42-m.m. Q.F., 2 M. . .	4 f. tu. or l.car	Pro.	100,840 each	20·0	..	2600
"	Nueva Espana . . .		630	190	0	23	0	11	9	2	2600	"	2 12-c.m. (Hontoria), 4 57-m.m. Q.F., 1 M.	2 l. car.	1889	..	18·0	106	..
to.g.b.	Rapido		570	190	0	23	0	10	4	2	2600	"	2 12-c.m. (Hontoria), 4 57-m.m. Q.F., 1 M..	2 l. car.	1891	..	18·0	106	..
cr.	Reina Christina (b) . .		3520	282	2	42	7	16	5	1	3970	"	6 16-c.m. (Hontoria), 2 7-c.m. do., 3 57-m.m. Q.F., 2 42-m.m. do., 6 3-pdr. do., 2 M.	5 f. tu. or l.car	1886	..	17·5	600	..
"	Reina Mercedes (c) . .		3090	278	10	42	7	16	5	1	3700	"	6 16-c.m. (Hontoria), 2 7-c.m. do., 3 57 m.m. Q.F., 2 42-m.m. do., 6 37-m.m. do., 2 M.	5 f. tu. or l.car	1887	..	17·5	600	..
"	Reina Regente* .	P. 6″–3″	5000	318	6	50	6	20	0	2	11,000	"	4 20-c.m. (Hontoria), 6 12-c.m. do., 6 6-pdr. Q.F., 4 3-pdr. do., 5 M.	5 f. tu. or l.car	1887	..	20·7	1100	..
sl.	Sanchez Barcaistegui .		935	203	5	29	6	12	2	1	1100	wood	3 12-c.m. (Hontoria), 2 75-m.m. (Krupp), 2 M.	..	1876	..	13·0	130	..
to.g.b.	Temerario		570	190	0	23	0	10	4	2	2600	steel	2 12-c.m. (Hontoria), 4 57-m.m. Q.F., 1 M.	2 l. car	1889	..	20·5	106	..
cr.	Velasco		1152	209	11	29	3	12	5	1	1500	iron	3 15-c.m. 4-ton (Armstrong), 2 7-c.m. (Hontoria), 2 M.	..	1881	..	14·3	220	..
to.g.b.	Veloz		750	213	0	27	0	8	6	2	4500	steel	2 12-c.m. (Hontoria), 4 57-m.m. Q.F., 4 M.	2 l. car.	Bldg.	..	20·0	106	..
"	Vincente Yanez Pinzon .		571	190	0	23	0	10	4	2	2600	"	2 12-c.m. (Hontoria), 4 57-m.m. Q.F., 1 M.	2 l. car	1891	..	19·0	106	..

(a) Armoured Conning Tower 9¾ inches thick. (b) To be used as a Transport. (c) To be used as a Cavalry Transport. * Lost with all hands, March, 1895.

Seven gunboats of from 216 to 255 tons, and from 185 to 318 I.H.P.
Small Steamers, classed as third-class gunboats, &c., forty in number, 86 to 348 tons.

SWEDEN.—Armoured Ships.

Class.	NAME.		Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Turret.	Armour. Belt.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
			tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons.	knots.
a.g.b.	Berserk	(iron)	452	131 3	29 6	8 3	2	155	14	2½	34 ¾″	1 24-c.m. 15-ton, 2 M.	..	1874	..	8·0	19	..
”	Björn	(iron)	457	131 3	26 3	8 3	2	155	14	2½	34 ¾″	1 24-c.m. 15-ton, 2 M.	..	1874	..	8·0	19	..
”	Fenris	(iron)	259	104 11	22 4	7 10	1	44	11	2	34 ¾″	1 24-c.m. 15-ton, 2 M.	..	1872	..	6·0	7	..
”	Folke	(iron)	460	131 3	26 3	8 3	2	155	14	2½	34 ¾″	1 24-c.m. 15-ton, 2 M.	..	1875	..	8·0	19	..
”	Gerda	(iron)	457	131 3	26 3	8 3	2	133	14	2½	34 ¾″	1 24-c.m. 15-ton, 2 M.	..	1873	..	8·0	19	..
c.d.s.,t	Göta	(steel)	3135	258 6	48 0	16 0	2	4677	11½–9¾ 10½ C.T.	11½	.. 2″	2 10-in., 4 6-in., 5 Q.F. do., 6 M.	3 f. tu. orl.car.	1890	..	15·96	200	..
a.g.b.	Hildur	(iron)	457	131 3	26 3	8 3	2	133	14	2½	34 ¾″	1 24-c.m. 15-ton, 2 M.	..	1872	..	8·0	19	..
c.d.s.,t.	John Ericsson	(iron)	1500	200 2	45 11	11 6	1	380	11½ 9¾ C.T.	4½	31½ 1″	2 24-c.m. 15-ton, 2 M.	..	1865	..	6·0	112	..
”	Loke	(iron)	1600	205 3	45 11	11 10	1	430	18 9¾ C.T.	4½	40 1″	2 24-c.m. 15-ton, 2 M.	..	1871	..	7·0	112	..
”	Odin	(steel)	3400	270 4	47 10	16 6	2	3700	12	12 5 Casemates.	.. 2″	2 25-c.m., 4 12-c.m. Q.F., 6 57-m.m. do., 10 M.	1 f. tu. orl.car.	Bldg.	..	16·0	..	..
a.g.b.	Sköld	(iron)	247	104 11	22 4	8 3	1	17	9	1	34 ¾″	1 24-c.m. 15-ton, 2 M.	..	1869	..	4·0	5	..
”	Sölve	(iron)	454	131 3	29 6	8 3	2	155	14	2½	34 ¾″	1 24-c.m. 15-ton, 2 M.	..	1875	..	8·0	19	..
c.d.s.,t.	Svea	(steel)	2900	249 4	49 3	15 9	2	3100	11½ 10½ C.T.	11½	.. 2″	2 10-in. 27-ton (Armstrong), 4 6-in. 4-ton do., 4 Q.F., 6 M.	3 f. tu. orl.car.	1886	127,300	15·45	200	800 at 12 knots.
t.	Thordön	(iron)	1500	200 2	45 11	11 6	1	380	11½ 9¾ C.T.	4½	26 1″	2 24-c.m. 15-ton, 2 M.	..	1866	..	6·0	112	..
c.d.s.,t.	Thule	(steel)	3135	249 4	49 3	15 9	2	3150	11½ 10½ C.T.	11½–7¾	22 2″	2 10-in. (Armstrong) 4 6-in. do., 5 Q.F., 6 M.	3 f. tu. orl.car.	1892	..	16·0	..	..
”	Tirfing	(iron)	1500	200 2	45 11	11 6	1	380	11½ 9¾ C.T.	4½	26 1″	2 24-c.m. 15-ton, 2 M.	..	1867	..	6·0	112	..
a.g.b.	Ulf	(iron)	457	131 3	26 3	8 3	2	155	14	2½	34 ¾″	1 24-c.m. 15-ton, 2 M.	..	1873	18,000	8·0	20	..

SWEDEN.—Unarmoured Ships.

Class.	NAME.	Displacement.	Length.		Beam.		Draught of Water.		Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft.	in.	ft.	in.	ft.	in.								knots.	tons.	knots.
corv.	Balder	1886	203	5	36	0	18	4	1	1380	wood	2 15-c.m. (Armstrong), 6 12-c.m., 2 Q.F., 4 M.	..	1870	..	12·0	200	940
g.v.	Blenda	500	167	4	25	11	9	2	2	590	iron	1 27-c.m., 1 12-c.m., 2 M.	..	1875	..	12·0	98	..
"	Disa	500	167	4	25	11	9	2	2	590	"	1 15-c.m., 1 12-c.m., 2 Q F., 2 M.	..	1877	..	12·0	98	..
tor. ship.	Drott	630	173	10	26	3	9	6	2	960	"	4 Engström, Q.F.	3 f. tu. or 1.car	1877	..	13·0	100	1000
g.v.	Edda	640	180	5	27	3	9	6	2	960	"	1 27-c.m., 1 15-c.m., 2 Q.F., 2 M.	..	1882	..	13·0	80	..
corv.	Freja	2000	216	6	39	4	18	9	1	1750	steel&wood	4 15-c.m. 4-ton, 8 12-c.m., 4 Q.F., 4 M.	..	1885	..	12·0	180	..
g.v.	Rota	537	170	7	26	3	9	2	2	780	iron	1 27-c.m. 24-ton, 1 12-c.m., 2 M.	..	1878	..	13·0	80	..
corv.	Saga	1535	200	2	32	10	17	1	1	900	wood	1 15-c.m. 5-ton (Armstrong), 6 12-c.m., 4 M., 2 l.	..	1878	..	11·0	170	..
g.v.	Skäggald	537	170	7	26	3	9	2	2	780	iron	1 27-c.m. 24-ton, 1 12-c.m., 2 M.	..	1879	..	13·0	80	..
"	Skagul	537	170	7	26	3	9	2	2	780	"	1 27-c.m. 24-ton, 1 12-c.m., 2 M.	..	1878	..	13·0	80	..
"	Skuld	537	170	7	26	3	9	2	2	780	"	1 27-c.m. 24-ton, 1 12-c.m., 2 M.	..	1880	..	13·0	80	..
"	Urd	537	170	7	26	3	9	2	2	780	"	1 27-c.m. 24-ton, 1 12-c.m., 2 Q.F., 2 M.	..	1877	..	13·0	80	..
"	Verdande	537	170	7	26	3	9	2	2	780	"	1 27-c.m. 24-ton, 1 12-c.m., 2 M.	..	1879	..	13·0	80	..

Four gunboats of 190 to 200 tons, and about 130 I.H.P. each, and carrying 1 12-c.m. B.L.R. and 2 M.; also one gunboat of 280 tons and 440 H.P., armed with 4 quick-firing guns. Torpedo School-vessel, Ran, built of steel and of 175 tons displacement, 140 I.H.P. and 10 knots speed.

TURKEY.—Armoured Ships.

Class.	NAME.		Displacement.	Length.	Beam.	Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Turret or Battery.	Armour. Belt.	Backing.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
			tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.					knots.	tons.	
a.c.	Abdel-kader	. . .	8000	341 0	65 6	..	..	12,000	..	14	2	4 24-c.m. (Krupp), 6 15-c.m. do., 10 Q.F.	10 f. tu or l. car	Bldg.	..	..	..	..
c.b.	Assar-i-Schefket	.(iron)	2080	203 5	42 7	16 5	2	1750	4½	6	9	1 9-in. (Armstrong), 4 7-in. do., 4 M., 4 l.	..	1868	..	11·0	300	..
"	Assar-i-Tevfik	.(iron)	4687	272 4	52 6	24 11	1	3560	6	8	9	8 24-c.m. (Krupp), 2 21-c.m. do., 7 M., 4 l.	..	1868	..	13·0	400	..
"	Avni-Illah .	.(iron)	2400	226 4	36 0	16 5	1	2200	5	6	10	4 9-in. 12-ton M.L.R. (Armstrong), 4 M., 4 l.	1 l. car.	1869	..	12·0	220	..
b.	Azizieh (a) .	.(iron)	6400	292 0	55 9	25 7	1	3735	5	5¼	9	2 24-c.m. (Krupp), 8 15-c.m. do., 6 10-c.m. do., 7 M., 2 l.	2 l. car.	1864	..	13·0	750	..
c.b.	Feth-i-Bulend .	.(iron)	2806	236 3	39 4	18 1	1	3250	6	9	10	4 9-in. 12-ton M.L.R. (Armstrong), 4 M., 4 l.	1 l. car.	1869	..	13·0	300	..
a.g.b.	Feth-el-Islam .	.(iron)	335	101 9	24 7	5 11	1	290	3	3	10	2 7-in. (Armstrong), 2 l.	..	1864	..	8·0	20	..
c.b.	Hamidieh . .	.(iron)	6700	292 0	55 9	24 10	1	4500	5	9	18	10 26-c.m. (Krupp), 2 17 c.m. do., 6 Q.F., 2 M.	2 l. car.	1885	..	13·0	600	..
a.g.b.	Hisber . .	.(iron)	404	144 4	30 10	5 7	1	400	3	3	5½	2 12-c.m. (Krupp), 2 M., 2 l. . . .	..	1875	..	7·0	20	..
t.	Hufzi-el-Rahman	.(iron)	2540	204 0	45 11	14 5	1	200 nom.	5	4½	10	2 12-ton M.L.R. (Armstrong), 2 6½-ton do., 1 5-in. (Krupp), 6 M. . .	..	1868	..	12·0	200	..
c.b.	Idjilalieh . .	.(iron)	2266	213 3	42 7	17 4	1	1800	4·5	6	13	2 12½-ton M.L.R. (Armstrong), 2 6½-ton do., 1 15-c.m. (Krupp), 4 M., 4 l.	..	1870	..	11·0	300	..
b.	Mahmudieh (a) .	.(iron)	6400	292 0	55 9	25 7	1	3735	5	5¼	9	2 24-c.m. (Krupp), 8 15-c.m. do., 6 10-c.m. do., 7 M., 2 l.	2 l. car.	1864	..	12·0	750	..
a.g.b.	Memdooyeh	. . .	335	101 9	24 7	5 11	1	290	3	3	10	2 7-in. (Armstrong), 2 l. . . .	..	1864	..	8·0	20	..
c.b.	Mesoodieh . .	.(iron)	9120	331 5	59 0	25 11	1	7431	10 1″	12	10	12 18-ton M.L.R. (Armstrong), 3 15-c.m. (Krupp), 7 M., 6 l.	..	1874	..	13·0	600	..
"	Muin-i-Zaffer .	.(iron)	2400	230 0	36 0	16 5	2	2200	5	6	10	4 12-ton M.L.R. (Armstrong), 1 12-c.m. K., 4 M., 4 l.	1 l. car.	1869	..	12·0	220	..
"	Mukadim-i-Hair	.(iron)	2806	236 3	39 4	18 1	1	3000	6	9	10	4 12-ton M.L.R. (Armstrong), 1 12-c.m. (Krupp), 4 M., 4 l.	1 l. car.	1872	..	12·0	300	..
"	Nedjim-i-Schefket	.(iron)	2080	203 5	42 7	16 5	2	1900	4¼	6	9	1 9-in., 4 7-in. (Armstrong), 4 M., 4 l. .	..	1868	..	11·0	300	..
b.	Orkanieh (a) .	.(iron)	6400	292 0	55 9	25 7	1	3735	5	5¼	9	2 24-c.m. (Krupp), 8 15-c.m. do., 6 10-c.m. do., 7 M., 2 l.	2 l. car.	1865	..	12·0	750	..
"	Osmanieh (a) .	.(iron)	6400	292 0	55 9	25 7	1	3735	5	5¼	9	2 24-c.m. (Krupp), 8 15-c.m. do., 6 10-c.m. do., 7 M., 2 l.	2 l. car.	1864	..	12·0	750	..

(a) These ships are converted or are being converted. They are cut down forward and aft, and a barbette fitted at each end with one 24-c.m. B.L. (Krupp) in each.

TURKEY.—Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	
g.v.	Beyruth . . .	609	173 6	26 7	12 10	1	160	..	2 12-c.m. (Krupp), 2 M., 4 l.	..	1863–89	..	10·0	120	..
sl.	Brussa	800	172 6	30 6	15 2	1	150	wood	2 6-in. (Krupp), 2 12-c.m. do., 2 M.	1 l. car.	1859–87	..	11·0	120	..
"	Edirneh	782	172 6	30 6	14 2	1	150	"	2 6-in. (Krupp), 2 12-c.m. do., 2 M.	1 l. car.	1859–87	..	11·0	120	..
cr.	Fezibahri	1815	226 0	35 0	14 0	2	2500	steel	6 15-c.m. (Krupp) .	7 f. tu. or l. car	Bldng.	..	17·0	..	..
"	Heibetnuma . . .	1960	226 0	37 0	14 0	1	2500 ind.	steel &wood	3 17-c.m. (Krupp), 6 12-c.m. do., 6 Q.F.	2 l. car.	1890	..	14·0	..	..
"	Hudavendikiar . . P.	4050	279 0	49 3	21 0	2	..	steel	2 21-c.m. (Krupp), 6 15-c.m. do., 4 10½-c.m. do.	5 f. tu. or l. car	Bldng.	..	..	..	..
gv.	Iskenderieh . . .	609	173 6	26 7	12 10	1	160	wood	2 12-c.m. (Krupp), 2 M., 4 l.	..	1863–85	..	11·0	120	..
"	Lutfi-hamayoun . .	1313	210 0	35 0	14 0	1	2800	composite	4 6-in. (Krupp), 6 4·7-in. do., 6 Q.F.	2 l. car.	1892	..	13·0	..	..
sl.	Mansureh	800	174 10	30 6	15 2	1	150	wood	2 6-in. (Krupp), 2 12-c.m. do., 2 M.	1 l. car.	1863–88	..	11·0	120	..
corv.	Mehemet Selim . . .	1300	196 10	32 10	16 6	1	450	"	10 15-c.m. (Krupp), 4 M., 4. l.	1 l. car.	1875	..	11·0	250	..
g.v	Mehrieh	609	173 6	26 7	12 10	1	160	"	2 12-c.m. (Krupp) 2 M., 4 l	..	1863	..	10·0	120	..
cr.	Mookbir-i-Sooroor (T. Sch.)	1477	209 11	38 0	17 5	1	450	..	22 guns	..	1879	..	..	..	..
sl.	Muzafer	800	174 10	30 6	15 2	1	150	wood	2 6-in. 5-ton (Krupp), 2 12-c.m. do., 2 M.	1 l. car.	1863–88	..	12·0	150	..

Turkey.—Unarmoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.								knots.	tons.	
to.g.b.	Namet	900	230 0	31 0	16 6	2	4500	steel	2 10½-c.m. (Krupp), 6 87-m.m. do., 10 Q.F.	2 l. car.	1891	..	19·0	..	..
"	Peleng-i-deria	900	230 0	31 0	16 6	2	4500	"	2 10½-c.m. (Krupp), 6 87-m.m. do., 10 Q.F.	2 l. car.	1890	..	19·0	..	..
g.v.	Sedul Bahr	800	173 6	26 7	11 6	1	160	wood	4 4¾-in. (Krupp), 6 M.	2 l. car.	1894	..	12·7	120	..
cr.	Selimieh P	4050	279 0	49 3	21 0	2	..	steel	2 21-c.m. (Krupp), 6 15-c.m. do., 4 10½-c.m. do.	..	Bldng.	..	..	..	..
"	Shadie	1815	226 0	35 0	14 0	2	2500	"	6 15-c.m. (Krupp).	7 f. tu. or l. car	Bldng.	..	17·0	..	..
to.g.b.	Shahani-deria	450	200 0	23 0	9 0	2	3000	"	2 4-in. Q.F. (Krupp), 6 47-m.m. do.	4 l. car.	1892	..	22·0	..	..
"	New vessel (Y)	900	230 0	31 0	16 6	2	4500	"	2 10½-c.m. (Krupp), 6 57-m.m. Q.F.	2 l. car.	Bldng.	..	19·0	..	..
sl.	Sinope	800	174 10	30 6	15 2	1	150	wood	2 6-in. (Krupp), 2 12-c.m. do., 2 M.	1 l. car.	1859–89	..	10·0	..	..
g.v.	Uthared	609	173 6	26 7	12 10	1	160	"	2 12-c.m. (Krupp), 2 M, 4 l.	..	1863–85	..	10·0	120	..
"	Zuhaf	800	173 6	26 7	11 6	1	160	"	4 4¾-in. (Krupp), 6 M.	2 l. car.	1894	..	12·7	120	..

Twenty-seven Despatch vessels and yachts, of 194 tons to 1512 tons displacement, and 50 h.p. to 800 h.p. About one-half of these vessels are built of wood.

Five Gunboats, of 200 tons displacement and 60 h.p., and about 10 knots speed. Six gunboats, 120 feet in length, of 200 tons displacement and carrying 4 guns, are now building.

UNITED STATES.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Turret or Battery.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dischargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons.	knots.
c.d.s., t.	Ajax (1 turret) (iron)	2100	226 4	43 7	13 9	1	340	5	11	..	2 15-in. smooth-bores, 2 l.	..	1864	125,000	6·0	160	..
to. ram	Alarm . (iron)	720	172 6	29 3	11 2	1	800	4 (on traverse)	..	16	1 6-in., 2 Q.F., 1 M.	..	1873	..	11·0	..	..
c.d.s., t.	Amphitrite (2 t.) . (iron)	3990	249 4	55 9	14 3	2	1600	9 C. T. 7½	11½	.. 2″	4 10-in., 2 4-in. Q.F., 2 6-pdr. do., 2 3-pdr. do., 2 37-m.m. do.	..	1883	..	12·0	300	1800
a.c.b.	Brooklyn . (steel)	9250	400 6	64 0	24 0	2	16,000	3	8–5 C.T. 7½	.. 6″–3″	8 8-in., 12 5-in. Q.F., 12 6-pdr. do., 4 1-pr. do., 4 M.	6 f. tu. or l.car	Bldng.	700,000	21·0	1650	6216
c.d.s., t.	Camanche (1 t.) (iron)	1875	200 2	45 11	11 6	1	350	5	10	..	2 15-in. 19-ton smooth-bores	..	1863	125,000	6·0	160	..
c.d.s., t.	Canonicus (1 t.) (iron)	2100	226 4	43 7	13 9	1	320	5	10	..	2 15-in. 19-ton smooth-bores	..	1864	125,000	6·0	160	..
c.d.s., t.	Catskill (1 t.) (iron)	1875	200 2	45 11	11 6	1	350	5	10	..	2 15-in. 19-ton smooth-bores.	..	1863	..	6·0	150	..
c.l.b., t.	Indiana . (steel)	10,288	348 0	69 3	24 0	2	9000	18 C. T. 10	17 6 to 8 in. small turrets	6 3″	4 13-in., 8 8-in., 6 4-in. Q.F., 20 6-pdr. do., 6 1-pdr. do., and 4 M.	6 f. tu. or l.car	1893	604,000	16·0	400 1800	3600 16,000
c.l.b., t.	Iowa . . .	11,410	360 0	72 0	24 0	..	11,000	14	15 5 Top-sides.	.. 3–2½	4 12-in. 45-ton, 8 8-in., 6 4-in. Q.F., 20 6-pr. do., 6 1-pr. do., 4 M.	6 f. tu. or l.car	Bldng.	900,000	16·5	2000	6000
c.d.s., t.	Jason (1 t.) (iron)	1875	200 2	45 11	11 6	1	350	5	11	..	2 15-in. 19-ton smooth-bores.	..	1864	..	6·0	150	..
c.d.s.ram	Katahdin . (steel) (was Ammen)	2050	243 0	43 6	15 0	2	4800	6	.. 18 C.T.	.. 6″–3″	4 6-pdr. Q.F.	Nil	1893	186,000	17·0	..	..
c.d.s., t.	Lehigh (1 t.) (iron)	1875	200 2	45 11	11 6	1	350	5	11	..	2 15-in. 19-ton smooth-bores.	..	1864	..	6·0	150	..
c.d.s., t.	Mahopac (1 t.) (iron)	2100	226 4	43 7	13 9	1	320	5	10	..	2 15-in. 19-ton smooth-bores.	..	1865	..	6·0	160	..
Battle-ships	Three new ships .	10,000	..	..	..	..	..	..	..	..	.. ..	..	Proj.	800,000 each	..	..	..

UNITED STATES.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse-power.	Armour. Belt.	Armour. Turret or Battery.	Backing. Deck Plating.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.			inches.	inches.	inches.				£	knots.	tons.	knots.
a.c., t.	Maine (2 t.) (steel)	6682	310 0	57 0	21 6	2	9000 9224(*t*)	12	12 C. T. 10	.. 4″–2″	4 10-in. 26-ton, 6 6-in., 8 6-pdr. Q.F., 8 1-pdr. do., 4 M.	7 f. tu. or l.car	1890	517,600	19 0 (*t*)19·99	822	7000
c.d.s., t.	Manhattan (1 t.)(iron)	2100	226 4	43 7	13 9	1	320	5	10	..	2 15-in. 19-ton smooth-bores .	..	1865	..	6·0	160	..
c.l.b., t.	Massachusetts (steel)	10,288	348 0	69 3	24 0	2	9000	18 C. T. 10	17 8 to 6 small T.	6″ 3″	4 13-in., 8 8-in., 4 6-in., 20 6-pdr. Q.F., 6 1-pdr. do., 4 M.	6 f. tu. or l.car	1893	604,000	16·25	400 1800	3600 16,000
c.d.s., t.	Miantonomoh (2 t.) (iron)	3990	249 4	55 9	14 3	2	1600	7	11½	8 2″	4 10-in., 2 4-in. Q.F., 2 6-pdr. do., 2 3-pdr. do., 2 1-pdr. do.	..	1876 (rebuilt)	272,000	10·5	330	1800
c.d.s., t.	Monadnock (2 t.) (iron)	3990	249 4	55 9	14 3	2	1600	9	11½	8 2″	4 10-in., 2 6-pdr. Q.F., 2 3-pdr. do., 2 1-pdr. do., 2 M.	..	1883 (rebuilt)	272,000	12·0	330	1800
c.d.s., t.	Montauk (1 t.) (iron)	1875	200 2	45 11	11 6	1	350	5	11	..	2 15-in. 19-ton smooth-bores .	..	1864	..	5·5	160	..
c.d.s., b.	Monterey (steel) .	4138	256 0	59 0	14 9	2	5072	13	14 10 C. T.	.. 3″–2″	2 12-in. 45-ton, 2 10-in., 6 6-pdr. Q.F., 4 1-pdr. do., 2 M.	..	1891	..	14·4 13·6	200	..
c.d.s., t.	Nahant (1 t.) (iron)	1875	200 2	45 11	11 6	1	350	5	11	..	2 15-in. 19-ton smooth-bores .	..	1863	..	6·0	160	..
c.d.s., t.	Nantucket (1 t.)(iron)	1875	200 2	45 11	11 6	1	350	5	11	..	2 15-in. 19-ton smooth-bores .	..	1863	..	5·6	160	..
a.c.	New York (steel)	8500	380 6	64 10	23 3½	2	16,500	4 in way of machinery.	10 C.T. 7	.. 6″–3″	6 8-in., 12 4-in. Q.F., 8 6-pdr. do., 4 1-pdr. 4 M.	6 f. tu. or l.car	1891	597,000	21·0	750 1150	13,500
c.l.b., t.	Oregon . (steel)	10,288	348 0	69 3	24 0	2	9000 9500(*t*)	18 C. T. 10	17 8 to 6 small T.	.. 3″	4 13-in., 8 8-in., 4 6-in., 20 6-pdr. Q.F., 6 1-pdr. do., 4 M.	7 f. tu. or l.car	1893	636,000	16·0 17·5 (*t*)	400 1800	3600 16,000
c.d.s., t.	Passaic (1 t.) (iron)	1875	200 2	45 11	11 6	1	350	5	11	..	2 15-in. 19-ton smooth-bores .	..	1863	..	6·0	160	..
c.d.s., t.	Puritan (2 t.) (iron)	6060	280 0	60 1½	18 1	2	3700	12	11½	.. 2″	4 12-in., 6 4-in. Q.F., 4 3-pdr. do., 4 1-pdr. do., 4 M.	..	1884 (rebuilt)	..	13·0	580	..
c.d.s., t.	Terror (2 t.) (iron)	3990	249 4	55 9	14 3	2	1600	7	11½	8 1½″	4 10-in., 2 6-pdr. Q.F., 2 3-pdr. do., 2 1-pdr. do., 2 M.	..	1883 (rebuilt)	206,800	12·0	330	1800
t.	Texas (2 t.) (steel)	6300	290 0	64 7	22 6	2	8600	12	12	.. 3″	2 12-in. 46-ton, 6 6-in. do., 12 6-pr. Q.F., 6 1-pr. do., 4 37-m.m. do., 2 M.	6 f. tu. or l car	1892	495,000	17·0	850	7000
c.d.s., t.	Wyandotte (1 t.)(iron)	2100	225 0	43 7	13 6	1	320	5	10	..	2 15-in. 19-ton smooth-bores	..	1864	..	6·0	160	..

UNITED STATES.—Unarmoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.							£	knots.	tons.	knots.
cr.	Adams	1375	183 9	35 0	14 2	1	550	wood	1 8-in. 8-ton M.L.R., 4 9-in. smooth-bore, 1 60-pdr., 2 l., 3 M.	..	1874	..	9·8	150	..
g.v.	Albatross (was No. 9)	1260	220 0	39 0	11 0	..	1790	”	8 4-in. Q.F., 4 6-pdr. do., 2 1-pdr. do., 2 M.	1 f. tu.	Bldg.	..	14·0	..	..
g.v.	Alert	1020	173 10	31 10	12 10	1	656	iron	1 8-in. 8-ton M.L.R., 4 9-in. smooth-bore, 1 60-pdr., 2 l.	..	1874	..	9·0	140	..
sl.	Alliance	1375	183 9	36 0	14 2	1	774	wood	1 8-in. 8-ton M.L.R., 4 9-in. smooth-bore, 1 60-pdr., 2 l., 1 M.	..	1875	..	9·0	130	..
cr.	Atlanta . pp. 1½″	3189	270 0	42 0	18 0	1	3511	steel	2 8-in. 11¾-ton, 6 6-in. 5-ton, 2 6-pdr. Q.F., 2 3-pdr. do., 2 1-pdr. do., 4 47-m.m. and 37-m.m. do., 2 M.	..	1884	123,600	16·33	490	4000
”	Baltimore . P. 4″–2½″	4600	315 0	48 6	20 6	2	10750	”	4 8-in., 6 6-in., 4 6-pdr. Q.F., 2 3-pdr. do., 2 1-pdr. do., 6 M.	5 f. tu. or l.car	1888	210,000	20·6 19·84	1140	6800
..	Bancroft	838	180 0	32 0	11 6	2	1213	..	4 4-in. Q.F., 2 6-pdr. do., 2 3-pdr. do., 1 1-pdr. do., 2 M.	2 f. tu. or l.car	1892	..	14·37	200	4200
cr.	Bennington	1750	230 0	36 0	14 0	2	3533	steel	6 6-in., 2 6-pdr. Q.F., 2 3-pdr. do., 1 1-pdr. do., 4 M.	2 l. car	1890	98,000	17·5	400	6500
”	Boston . pp. 1½″	3189	270 0	42 0	18 0	1	3780	”	2 8-in. 11¾-ton, 6 6-in. 5-ton, 2 6-pdr. Q.F., 2 3-pdr. do., 2 1-pdr. do., 2 47-m.m. do., 2 37-m.m. do., 2 M.	..	1884	123,200	15·0	490	4000
g.v.	Castine (a)	1220	198 0	32 0	12 2	2	1600	”	8 4-in. Q.F., 4 6-pdr. do., 2 1-pdr. do., 2 M.	..	1892	..	16·2	285	5750
cr.	Charleston . P. ¾″	4040	300 0	46 2	19 6	2	7500	”	2 8-in., 6 6-in., 4 6-pdr. Q.F., 2 3-pdr. do., 2 1-pdr. do., 6 M.	4 f. tu. or l.car	1888	..	18·7 18·19	800	5200
”	Chicago . pp. 1½″	4500	315 0	48 2	19 0	2	5248	”	4 8-in., 8 6-in., 2 5-in., 10 6-pdr. Q.F., 4 1-pdr. do., 2 37-m.m. do., 2 M.	..	1885	177,800	16·3	940	5000
”	Cincinnati . P. 2½″	3183	291 3	42 0	18 0	2	10,000	”	1 6-in., 10 5-in. Q.F., 8 6-pdr. do., 4 1-pdr. do., 2 M.	6 f. tu. or l.car	1892	220,000	19·0	556	4500
”	Columbia (was Cr. No. 12) . P. 4″–2½′	7475	412 0	58 2	22 6½	3	21,500	”	1 8-in., 2 6-in., 8 4-in. Q.F., 12 6-pdr. do., 4 1-pdr. do., 4 M.	6 f. tu. or l.car	1892	545,000	22·8	2400	13,000

(a) Has been lengthened 14 feet amidships to increase her stability. (t) On trial.

UNITED STATES.—Unarmoured Ships—*continued*.

Class.	NAME.	Displacement.	Length.	Beam.	Mean Draught of Water.	Propellers.	Indicated Horse-power.	Material of Hull.	Armament. Guns.	Armament. Fish Torpedo Dis-chargers	Date of Launch.	Cost.	Speed.	Coal Supply.	Distance that can be steamed at 10 knots.
		tons.	ft. in.	ft. in.	ft. in.							£	knots.	tons.	knots.
cr.	Concord . . .	1700	230 0	36 0	14 0	2	3513	steel	6 6-in., 2 6-pdr. Q.F., 2 3-pdr. do., 1 1-pdr. do., 4 M.	2 l. car	1890	98,000	17·3 17·0	400	6500
”	Detroit . . .	2000	257 0	37 0	14 6	2	5400	”	9 5-in. Q.F., 6 6-pdr. do., 2 1-pdr. do., 2 M.	6 f. tu. or l.car	1892	..	18·71	435	6000
”	Dolphin . . .	1485	239 6	31 10	14 2	1	2300	”	2 4-in. Q.F., 2 6-pdr. do., 4 M.	..	1884	61,000	15·5	310	..
”	Essex. . . . (Fitting for a gunnery ship)	1375	183 9	36 0	14 2	1	800	wood	(†) 1 8-in. 8-ton smooth-bore, 4 9 in. 4-ton do., 1 60-pdr., 2 l., 2 M.	..	1874	..	10·0	140	..
”	Lancaster . . .	3250	236 3	45 11	19 1	1	750	”	10 8-in. M.L.R., 2 6-pdr. Q.F., 2 1-pdr. do., 5 M., 1 l.	..	1859	..	9·6	288	..
g.v.	Machias (*a*) . .	1220	198 0	32 0	12 2	2	1600	steel	8 4-in. Q.F., 4 6-pdr. do., 2 1-pdr. do., 2 M.	..	1892	..	15·46	285	5750
cr.	Marblehead . .	2000	257 0	37 0	14 6	2	5400	”	9 5-in. Q.F., 6 6-pdr. do., 2 1-pdr. do., 2 M.	6 f. tu. or l.car	1892	122,500	18·94	435	6000
corv.	Marion . . .	1900	216 6	37 0	16 5	1	1172	”	1 8-in. 8-ton M.L.R., 6 9-in. 4-ton smooth-bores, 1 60-pdr., 3 l., 3 M.	..	1873	..	11·0	156	..
cr.	Minneapolis (was Cr. No. 13) P. 4″–2½″	7475	412 0	58 2	22 6½	3	21,000 20,366 (*t*)	”	1 8-in., 2 6-in. Q.F., 8 4-in. do., 12 6-pdr. do., 4 1-pdr. do., 4 M.	5 f. tu. or l.car	1893	Contract price 338,000 83,000 Premium.	21·0 23·073 (*t*)	2400*	19,000
corv.	Mohican . . .	1900	216 6	37 0	16 5	1	1172	”	1 8-in. M.L.R., 8 9-in. smooth-bores, 1 60-pdr., 3 M., 4 l.	..	1882	..	11·0	160	..
cr.	Montgomery . .	2000	257 0	37 0	14 6	2	5100	”	9 5-in. Q.F., 6 6-pdr. do., 2 1-pdr. do., 2 M.	6 f. tu. or l.car	1892	..	18·87	435	6000
”	Newark . . P. 3″–2″	4083	310 0	49 0	18 9	2	8869	”	12 6-in., 4 6-pdr. Q.F., 4 3-pdr. do., 2 1-pdr. do., 7 M.	..	1890	250,000	19·0	850	5500
to.g.b.	Number 1 . . .	750	260 0	27 0	8 4	2	6000	”	3 4-in. Q.F., 4 6-pdr. do., 4 1-pdr. do., 2 M.	6 f. tu. or l.car	Building	..	23·0	..	..

cr.	Olympia . . P. 4¾″–2″	5800	340	0	53	0	21	6	2	13,500 17,363	steel barbette 4½in.	4 8-in., 10 5-in. Q.F., 14 6-pdr. do., 6 1-pdr. do., 4 M.	2 f. tu. 2 ta. do.	1892	477,600	21·69	1893	10,000
g.v.	Penguin (was No. 8) .	1313	290	0	39	6	9	0	..	(*t*) 1600	..	8 4-in. Q.F., 4 6-pdr. do., 2 1-pdr. do., 2 M.	1 f. tu.	Building	..	13·0	..	..
”	Petrel	890	176	3	31	0	11	7	1	1513	steel	4 6-in., 2 3-pdr. Q.F., 1 1-pdr. do., 4 M. .	..	1888	50,000	13·7	168	..
cr.	Philadelphia . P. 4″–2½″	4413	315	0	48	6	19	3	2	10,500	”	12 6-in., 4 6-pdr. Q.F., 4 3-pdr. do., 2 1-pdr. do., 7 M.	5 f. tu. or l. car	1889	265,000	19·68	1175	7000
g.v.	Porpoise (was No. 7) .	1313	290	0	39	6	9	0	..	1600	..	8 4-in. Q.F., 4 6-pdr. do., 2 1-pdr. do., 2 M.	1 f. tu.	Building	..	13·0	..	..
cr.	Raleigh . . P. 2½″	3183	291	3	42	0	18	0	2	10,000	steel	1 6-in., 10 5-in. Q.F., 8 6-pdr. do., 4 1-pdr. do., 2 M.	6 f. tu. or l. car	1892	28,600	19·0	556	4500
g.v.	Ranger (Surveying) .	1020	173	10	31	10	12	10	1	656	iron	1 60-pdr. M.L. Parrott, 1 M.	..	1874	..	10·0	127	..
”	San Francisco . P. 3″–2″	4083	310	0	49	2	18	9	2	10,400	steel	12 6-in., 4 6-pdr. Q.F., 4 3-pdr. do., 2 1-pdr. do., 7 M.	6 f. tu. or l. car	1889	270,000	20·2 19·52	680	4200
”	Vesuvius (Dynamite Gun Cruiser)	930	246	0	26	6	10	7½	2	4450	”	3 dynamite guns, 15 in. cal., 3 3-pdr. Q.F.	..	1888	70,000	21·65 21·42	150	..
”	Yantic	900	180	5	29	6	12	2	1	670	wood	1 8-in. M.L.R., 2 9-in. smooth-bore, 1 60-pdr., 1 M., 2 l.	..	1878	..	8·0	125	..
cr.	York Town . .	1703	230	0	36	0	14	0	2	3660	steel	6 6-in., 2 6-pdr. Q.F., 2 3-pdr. do., 1 1-pdr. do., 4 M.	2 l. car.	1888	98,000	17·2 16·14	400	6500

(*a*) Has been lengthened 14 feet amidships to increase her stability. (*t*) Trials. * Quantity, it is stated, that can be stowed. (†) Will receive a new armament.

Three paddle steamers.—Michigan (685 tons and 300 horse-power), and the Monocacy (1370 tons and 850 horse-power), and the Thetis of 1250 tons building.
Ten screw steamers, of from 300 tons to 560 tons, and about 300 to 500 H.P.

SHIPS BELONGING TO POWERS WHOSE NAVIES ARE OF LITTLE OR NO IMPORTANCE.

Belgium.—Twelve steam vessels, principally employed as packets, which are under the orders of the Government. Seven of these steamers are of 578 tons.

Bulgaria.—Eleven steamers of small size, of which one is used as the Prince's Yacht. Two armoured gun-boats, for the defence of the Danube.

Egypt.—This power has now no efficient war ships.

Hayti.—An iron corvette—Dessalines—of 16 knots speed, and armed with one 7-inch gun and 6 small guns. Three iron or steel sloops:—St. Michael, 1804, and Toussaint L'Ouverture, of from 500 to 900 tons, all of 12 to 14 knots speed, and armed with one large and four to eight small guns. Gun vessel, 22nd of December, of 900 tons, 9 knots speed, armed with four 40-pdr. Armstrongs. Two small gunboats of 14 knots speed, armed with one 10-c.m. quick-firing gun, just completed in France.

Liberia.—The Gorronammal gunboat of 150 tons displacement; completed 1892, and another one, the Rocktown, completed at Rotterdam in 1894.

Mexico.—The Zaragoza, built of steel, 1200 tons, 1300 horse power, 15 knots speed, and armed with four 12-c.m. guns and 4 rapid firing guns. Two gun vessels of 450 tons, and 11 knots speed, armed with two 6½-inch muzzle loaders and two small guns. Two small gunboats of 10 knots speed.

Morocco.—A torpedo cruiser, of 1200 tons displacement, 2500 HP., 18 knots speed, and carrying two guns, 12-c.m. B.L., and 4 Q.F. guns, built in 1892

Persia.—Despatch vessel—the Persepolis—of 1200 tons and 10 knots speed. She is armed with 5 small breech-loading guns.

Peru.—Lima, built in 1881, of 1700 tons displacement, 1800 horse-power, and 16-knots speed; armed with two 6-in. B.L.R. guns. Screw steamer Santa Rosa of about 400 tons.

Roumania.—The Elizabeta, a protected cruiser (deck 3 in. thick), built in 1887. She is 230 ft. long, 32 ft. 10 in. broad, has 1320 tons displacement, 4500 horse-power, 18 knots speed, and carries 4 17-c.m. B.L.R. guns, 4 quick-firing guns, 4 machine guns, and 4 torpedo launching tubes.

Three coast-guard vessels—Olthul, Siretul, and Bistriti—length, 100 ft.; breadth, 13½ ft.; draught of water, 6 ft.; speed, 11 knots natural draught, and 13¼ knots with forced draught. They carry 3 machine guns. They were built by the Thames Ironworks Co. in 1888.

Six gunboats of 45 to 110 tons, 7 to 9 knots speed.

One screw steamer (two guns, two machine guns).

Saint Domingo.—The Independencia, built in England, 1894, 170 ft. long, 25 ft. broad, displacement 322 tons, and armed with seven Hotchkiss quick-firing guns.

Sarawak.—Two gunboats, of 175 and 118 tons respectively, of low speed, each armed with two guns.

Siam.—Two corvettes (800 tons, 8 guns); two gun-vessels. One protected deck cruiser, the Maha Chakrkri, 290 ft. long, 39 ft. 4 in. broad, of 2500 tons displacement and 17 to 18 knots speed; armament, four 12-c.m. quick-firing guns, and ten 6-pdr. quick-firing guns.

Uruguay.—Gunboats: General Artiga, 274 tons, 12½ knots speed, 2 12-c.m. (Krupp), 2 M.; General Rivera, 300 tons, 12 knots speed, armed with 1 15-c.m. and 1 6-c.m. gun; and the General Jaurez.

BRITISH AND FOREIGN TORPEDO-BOAT FLOTILLAS.

The Tables below are substantially those which appeared in last year's *Naval Annual*. By the kind assistance of many torpedo-boat builders, British and foreign, they have been brought up to date; and notes of the chief events of the year that bear upon the subject have been added.

The following is the usual synopsis of the torpedo-boats, other than submarine-boats, described in the tables:—

Power.	Destroyers. above 150 ft.	Sea-going. 126 ft. to 150 ft.	1st Class. 115 ft. to 125 ft.	2nd Class. 101 ft. to 114 ft.	3rd Class. 86 ft. to 100 ft.	Vedettes. 85 ft. and under.	Summary. Boats of 101 ft. and above.	Summary. Boats of 100 ft. and under.	Total.
Great Britain ..	62	43	26	4	20	73	135	93	228
British Possessions	..	8	..	1	..	11	9	11	20
Argentine Republic	..	8	..	..	4	14	8	18	26
Austria-Hungary ..	..	30	..	5	26	9	35	35	70
Brazil	3	5	..	..	6	8	8	14	22
Chile	..	..	1	..	8	4	1	12	13
China	..	6	1	25	2	13	32	15	47
Costa Rica	..	..	..	..	..	1	..	1	1
Denmark	..	6	1	3	2	16	10	18	28
France	8	47	53	84	36	14	192	53	245
Germany	11	64	61	4	..	16	140	16	156
Greece	..	6	..	..	11	33	6	44	50
Italy	5	105	..	4	37	33	114	70	184
Japan	1	..	20	17	16	..	38	16	54
Mexico	..	5	..	..	..	..	5	..	5
Netherlands	13	6	9	3	6	23	31	29	60
Norway	..	..	..	7	3	4	7	7	14
Portugal	..	..	15	5	1	24	20	25	45
Roumania	..	3	..	..	..	2	3	2	5
Russia	17	55	6	1	..	109	79	109	188
Spain	..	12	24	2	..	6	38	6	44
Sweden	..	..	12	8	12	7	20	19	39
Turkey	4	9	17	..	7	..	30	7	37
United States ..	16	2	..	..	1	4	18	5	23
	140	420	246	173	198	424			

Great Britain and Dependencies.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Great Britain.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
TORPEDO-BOAT DESTROYERS													
Ardent	Chiswick	1894	200	19	7	2	250	4,500	27·84	1–12 pr. 5-6 prs.	2	45	60
Banshee	Birkenhead	1894	210	19·5	..	2	265	4,400	27·97	1–12 pr. 5–6 prs.	2	50	
Boxer	Chiswick	1894	200	19	7·8	2	250	4,800	29·31	1–12 pr. 5–6 prs.	2	45	60
Bruiser	Chiswick	1895	200	19	7·8	2	250	4,500	[27]	1–12 pr. 5–6 prs.	2	45	60
Charger	Poplar	1894	190	18·5	5·25	2	220	..	[26]	1–12 pr. 5–6 prs.	2	45	60
Conflict	East Cowes	1894	205·6	20	..	2	230	..	[27]	1–12 pr. 5–6 prs.	2	50	
Contest	Birkenhead	1894	210	19·5	..	2	265	4,400	27·4	1–12 pr. 5–6 prs.	2		
Daring	Chiswick	1893	185	19	6·3	2	220	4,842	28·65	2–12 prs. 3–6 prs.	3		50
Dasher	Poplar	..	190	18·5	5·25	2	220	..	[26]	1–12 pr. 5–6 prs.	2	45	60
Decoy	Chiswick	1894	185	19	7	2	220	3,900	27·64	1–12 pr. 3–6 prs.	3		50
Dragon	Birkenhead	1894	210	19·5	..	2	265	..	[27]	1–12 pr. 5–6 prs.	2	50	
Ferret	Birkenhead	1893	194	19·25	5	2	220	4,810	27·62	1–12 pr. 3–6 prs.	3		70
Fervent	Paisley	..	..	..	..	2	..	..	[27]	1–12 pr. 5–6 prs.	2		
Handy	Govan	..	..	..	..	2	..	..	[27]	1–12 pr. 5–6 prs.	2		
Hardy	Sunderland	..	196	19	5	2	215	..	[27]	1–12 pr. 5–6 prs.	2		
Hart	Govan	..	..	..	..	2	..	..	[27]	1–12 pr. 5–6 prs.	2		
Hasty	Poplar	1894	190	18·5	5·25	2	220	..	[26]	1–12 pr. 5–6 prs.	2	45	60
Haughty	Sunderland	..	196	19	5	2	245	..	[26]	1–12 pr. 5–6 prs.	2		
Havock	Poplar	1893	180	18·5	5·25	2	220	3,500	26·78	1–12 pr. 3–6 prs.	3	43	57
Hornet	Poplar	1893	180	18·5	5·25	2	220	4,000	27·31	1–12 pr. 3–6 prs.	3	43	57
Hunter	Govan	..	..	..	..	2	..	..	[27]	1–12 pr. 5–6 prs.	2		
Janus	Jarrow	1895	200	19·7	6·5	2	277	..	[27]	1–12 pr. 5–6 prs.	2	50	60
Lightning	Jarrow	..	200	19·7	6·5	2	277	..	[27]	1–12 pr. 5–6 prs.	2	50	60
Lynx	Birkenhead	1894	194	19·25	5	2	220	4,000	27·15	1–12 pr. 3–6 prs.	3	..	70
Opossum	Hebburn	..	200	19	5·2	2	264	..	[27]	1–12 pr. 5–6 prs.	2	50	60
Porcupine	Jarrow	..	200	19·7	6·5	2	277	..	[27]	1–12 pr. 5–6 prs.	2	50	60
Ranger	Hebburn	..	200	19	5·2	2	264	..	[27]	1–12 pr. 5–6 prs.	2	50	60
Rocket	Clydebank	1894	200	19·5	5·25	2	..	4,200	27·4	1–12 pr. 5–6 prs.	2	50	60
Salmon	Hull	1895	200	19·5	5·4	2	264	..	27·7	1–12 pr. 5–6 prs.	2	50	
Shark	Clydebank	1894	200	19·5	5·25	2	..	4,250	27·6	1–12 pr. 5–6 prs.	2	50	60
Skate	Barrow	1895	195	20·5	..	2	240	..	27·5	1–12 pr. 5–6 prs.	2		
Snapper	Hull	1895	200	19·5	5·5	2	264	..	[27]	1–12 pr. 5–6 prs.	2	50	
Spitfire	Elswick	1895	200	19	5·3	2	264	..	[27]	1–12 pr. 5–6 prs.	2	45	60
Starfish	Barrow	1894	195	20·5	..	2	240	..	[27]	1–12 pr. 5–6 prs.	2		
Sturgeon	Barrow	1894	195	20·5	..	2	240	..	[27]	1–12 pr. 5–6 prs.	2		
Sunfish	Hebburn	..	200	19	5·2	2	264	..	[27]	1–12 pr. 5–6 prs.	2		
Surly	Clydebank	1894	200	19·5	5·25	2	..	4,400	28·05	1–12 pr. 5–6 prs.	2		
Swordfish	Elswick	1895	200	19	5·3	2	264	..	[27]	1–12 pr. 5–6 prs.	2	45	60
Teazer	East Cowes	..	..	..	..	2	250	..	[27]	1–12 pr. 5– prs.	2		
Wizard	East Cowes	1895	..	..	..	2	250	..	[27]	1–12 pr. 5 6 prs.	2		
Zebra	Blackwall	..	200	20	6	2	..	..	[27]	1–12 pr. 5–6 prs.	2		
Zephyr	Paisley	..	..	..	..	2	..	..	[27]	1–12 pr. 5–6 prs.	2		
20 boats	..	pro.	..	..	..	2	..	..	[29]	..			
FIRST CLASS—													
1 (*ex* Lightning)	Chiswick	1877	84·6	10·9	5	1	27	460	19	..	1		
2–9 (8 boats)	Chiswick	1878–9	87	10·9	4	1	28	450	20	..	1	15	
10	Chiswick	1880	90·5	10·9	4	1	28	450	21·7	..	1	15	
11, 12 (2 boats)	Chiswick	1880	87	10·9	4	1	28	450	20	..	1	15	7
13	Lambeth	1878	87	10·9	4	1	28	460	21	..	2	15	7
14	Poplar	1878	87	11	4·5	1	33	550	22	..	2	15	7
15	..	..	87	10·9	4	1	28	450	21	..	2	15	7
17, 18 (2 boats)	Poplar	1877	86	11	4·5	1	33	450	21	..	2	15	7
19	East Cowes	1878	87	10·9	4	1	28	460	21	..	2	15	7
20	..	1880	87	10	4	..	28	360	16·9	..	..	15	
21, 22 (2 boats)	Chiswick	1885	113	12·5	5·7	1	63	730	20	..	3	..	10
23, 24 (2 boats)	Poplar	1885–6	113	12·5	5·5	1	67	600	19·5	2–3 prs.	3		
25–29 (5 boats)	Chiswick	1886	127·5	12·5	6·2	1	60	600	21	..	4	15	
30–33 (4 boats)	Poplar	1886	125	13	5·5	1	60–66	670	19·5	2–3 prs.	5	15	20
34–38 (5 boats)	East Cowes	1886	125	14·6	4	1	60–66	950	18–19	..	5	15	
39, 40 (2 boats)	Poplar	1885	100	12·5	..	..	40	500	..	..	1	15	
41–60 (20 boats)	Chiswick	1886	127·5	12·5	6·2	1	60	700	21	2–3 prs.	4	15	
61, 63–74, 76–78 (16 boats)	Poplar	1886	125	13	5·5	1	75	700	19–20	2–3 prs.	5	15	20
79	Poplar	1886	125	13	5·5	..	75	1,000	22·4	2–3 prs.	..	15	20
80	Poplar	1887	135	14	6	1	105	1,540	23	4–3 prs.	5	21	30
81 (*ex* Swift)	East Cowes	1885	150	17·5	..	1	125	..	..	6–3 prs.	3	25	35
82–87 (6 boats)	Poplar	1889	130	13·5	5·5	1	85	1,100	23	3–3 prs.	3	19	20
88, 89 (2 boats)	Poplar	1894	142	14·75	4	1	112	1,600	..	3–3 prs.	3	18	20
90	Poplar	1895	140	14·25	3·75	1	100	1,430	..	3–3 prs.	3	18	18
91, 92 (2 boats)	Chiswick	1894	140	15·5	7·5	1	130	2,400	23-24	3–3 prs.	3	18	25
93	Chiswick	1893	140	15·5	5·4	2	130	2,200	23·5	3–3 prs.	3	18	25
94–96 (3 boats)	East Cowes	1894	140	15·5	..	1	130	2,000	23·2	3 3 prs.	3	18	25
97	Birkenhead	1893	140	15·5	..	1	130	2,690	23.35	3–3 prs.	3	18	25

Great Britain and Dependencies—*continued.*

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Second Class—													
38–48 (10 boats)	Poplar	1889	60	9·2	3·7	1	16·5	230	16·5	1 mach.	1	9	1
49, 50 (2 boats)	Poplar	1887	60	8·5	3	1	15	200	17	1 mach.	1	9	1
51–62 (12 boats)	Chiswick ..	1878–9	60·5	7·5	3·5	1	..	..	16·5	..	2	7	
63	..	1879	60	..	..	1	..	..	15	..	2		
64–73 (10 boats)	Chiswick ..	1880–1	60·5	7·5	3·5	1	..	..	16–17	..	2	7	
74, 75, 96, 97 (4 boats)..	Poplar	1883	62	7·6	3·6	1	12	..	16	1 mach.	2	7	
76–95 (20 boats)	Chiswick ..	1882–3	63	7·5	3·5	1	..	..	16·5–17	..	2	7	
98	Chiswick ..	1883	66·3	7·5	2·5	hyd.	..	120	12·6	..	2	7	
99, 100 (2 boats)	Chiswick ..	1886	64	8	3·6	1	..	..	16–16·8	..	2	7	
101	..	..	64	..	..	..	..	..	..	..	2	7	
1–9 (9 boats)	East Cowes ..	..	56	..	..	1	12	..	14·5	2 mach.	sp.	..	·7
Victoria.													
Childers	Chiswick ..	1883	113	12·5	5·9	1	65	730	20	2–1 prs.	..	12	10
One boat	Poplar	1891	130	13·5	5·7	1	82	1,150	23	3–3 prs.	3	19	20
Nepean, Lonsdale (2 boats)	Chiswick ..	1884	63	7·5	3·2	1	12	150	17·5	..	1	7	
New South Wales.													
Acheron, Avernus (2 boats)	..	1879	..	..	..	1	16	300	16				
Queensland.													
Mosquito	Chiswick ..	1884	63	7·5	3·2	1	12	..	17	..	1	7	
Wasp	..	..	..	..	..	..	12	..	..	..	..	7	
Tasmania.													
One boat	Chiswick ..	1884	63	7·5	3·2	1	12	..	17	..	1	7	
New Zealand.													
Nos. 1–4 (4 boats)	Chiswick ..	1881	63	7·5	3	1	12	170	17	1 mach.	Sp.		
India.													
Nos. 1–3 (3 boats)	Chiswick ..	1888	134·5	14·8	7·1	1	96	1,270	23·2	2 Q.F.	5		
Nos. 4–6 (3 boats)	East Cowes ..	1889	130	14·6	..	..	95	1,030	20				
No. 7	Paisley	1888	130·4	14	..	..	92	1,060	21				

In the speed column, figures in brackets denote contract speeds to be attained.

The destroyers have boilers as follows :—

YARROW BOILERS :—Hardy, Haughty, Hornet, Opossum, Ranger, Salmon, Snapper, Spitfire, Sunfish, Swordfish.
THORNYCROFT BOILERS :—Ardent, Boxer, Bruiser, Daring, Decoy.
J. S. WHITE BOILERS :—Conflict, Teazer, Wizard, Zebra.
NORMAND BOILERS :—Banshee, Contest, Dragon, Ferret, Lynx, Rocket, Shark, Surly.
BLECHYNDEN BOILERS :—Skate, Starfish, Sturgeon.
LOCOMOTIVE BOILERS :—Charger, Dasher, Fervent, Hasty, Havock.
REED BOILERS :—Janus, Lightning, Porcupine.

NOTE.—In these lists "Chiswick" represents Messrs. John I. Thornycroft & Co. ; "Birkenhead," Messrs. Laird Bros. ; "Poplar," Messrs. Yarrow & Co. ; "E. Cowes," Mr. J. S. White ; "Paisley," Messrs. Hanna, Donald & Wilson ; "Govan," The Fairfield Shipbuilding Co. ; "Sunderland," Messrs. Doxford & Sons ; "Jarrow," Palmer's Shipbuilding Co. ; "Hebburn," Messrs. Hawthorn, Leslie & Co. ; "Clydebank," Messrs. J. and G. Thomson ; "Hull," Earle's Shipbuilding and Engineering Co. ; "Barrow," The Naval Construction and Armaments Co. ; "Elswick," Sir W. G. Armstrong, Mitchell & Co. ; and "Blackwall," The Thames Ironworks and Shipbuilding Co.

In the winter of 1894, both the Ferret and the Lynx got ashore, but were brought off without having received very serious damage.

All the named destroyers not noted as already launched will be launched ere the end of 1895.

All the destroyers are fitted for the discharge of 18in. Whitehead torpedoes. The earlier boats have, in addition to twin training tubes, a bow tube, but, it being feared that a torpedo discharged from this while the vessel was at high speed might be overrun, the later boats are provided with two single training tubes only, the bow tube being suppressed.

The Daring, at her progressive trials, was found to do 7·86 knots with 91 revolutions, 14·2 knots with 175 revolutions, 18·34 knots with 237 revolutions, 23·21 knots with 321 revolutions, and 28·65 knots with 387 revolutions.

Failure of piston rods fitted according to the Admiralty pattern caused a serious and very expensive breakdown in the Hornet during the manœuvres, and led to the general abandonment of that mode of fitting them.

Great Britain and Dependencies—*continued.*

At a preliminary trial of the Sturgeon a tube explosion occurred, an engineer and four men being killed.

In order to test the efficiency of the "destroyers" for the peculiar work which they are more especially designed to do, the Havock underwent a series of gunnery trials on April 6th, 1894. A specially constructed target, made to resemble a first-class torpedo boat, was placed as the centre of an evolutionary circle, the circumference of which, at a distance of 3,500 yards, was marked by buoys. Four series of attacks were made at different speeds, the firing in each case lasting one minute. In the first, the speed of the Havock was 10 knots, and, as she approached, bows on, she opened upon the target at 1,500 yards with her 12-pr. Q.F. In the second, the speed was again 10 knots, but the target bore about a point forward of the beam, and fire was opened at 800 yards with the 12-pr. and a 6-pr. Q.F. The target was never within 700 yards. In the third, the speed was 24 knots, the approach was made bows on, and firing began at 1,500 yards, and was continued while the Havock steamed about 800 yards. In the fourth, the speed was as high as possible, and the 12-pr. was used at 1,100 yards, and for a distance of about 800 yards. The weather was fine. After each attack, the target was examined, and the number of hits recorded. The conning tower was the point chiefly aimed at. It was found that the live shell from the 6-prs. produced more damage than the solid projectiles of the 12-pr., but the value of the 12-pr., as mounted on the Havock's conning-tower, was well established, that gun easily hitting the funnel of the target at 1,200 yards, when the destroyer was steaming at speed; in fact, so many hits were made on each of the runs that no torpedo boat could have survived the attacks. A mean of six rounds per minute was maintained. Ammunition for a quicker rate of fire could not have been provided.

Owing to the risk of injury to eyesight when boats are steaming at high speed, goggles are now supplied by the Admiralty at the rate of one pair for each officer, and three pairs for each of the crew. First-class torpedo boats are also supplied with two collision mats, one 8ft. by 6ft. and one 6ft. by 4ft. These are of Douglas's patent pattern.

Nos. 91 and 92 have four-cylindered triple-expansion engines supplied by two Thornycroft boilers. No. 91 at her trials did a mean of 23·74 knots for three hours, developing 2,639 I.H.P. The mean of two runs on the mile was 24·71 knots. No. 92, developing about 2,600 I.H.P., did a mean of 24·52 knots in six runs over the mile, and a mean of 24·12 knots for three hours.

No. 93, a twin-screwboat, with triple-expansion three-cylindered engines and Thornycroft boilers, did a mean of 23·846 knots on the mile, with 472 revolutions; and, during a three-hours' run, did a mean of 23·5 knots, with 467 revolutions.

No. 94 did a mean of 23·257 knots at her trials. No. 95 did a mean of 23·21 knots.

No. 97, developing a maximum of 2·690 I.H.P., did a mean of 23·71 knots on her mile runs, and a mean of 23·35 knots for thee hours.

On October 10th, 1894, a torpedo, fired from the tug Confiance, which is attached to the Defiance at Devonport, struck a rock in Cawsand Bay, and the air-chamber exploded with extreme violence, the weapon being blown into hundreds of pieces, some of which were thrown to a distance of a quarter of a mile.

The 14-in., instead of the 18-in. Whitehead is to be the weapon of the new British battleships, and of the Powerful and Terrible. The 18-in. torpedo remains the weapon of the destroyers and of the larger vessels that have been recently built.

All the mining vessels belonging to the War Department are to be fitted for the discharge of the Brennan controllable torpedo.

The four 130-ft. Indian boats are named Beluchi, Gurkha, Karen, and Pathan.

Mr. Seymour Allan, of Sydney, has invented a submarine torpedo-boat, a working model of which was tried in October 1894, in the public baths at Melbourne and at Sydney, before Rear-Admiral Bowden-Smith and others. The Admiral is reported to have declared that "if the vessel would do what the model performed, naval warfare would be revolutionised."

Argentine Republic.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
2 boats	Chiswick ..	1890–1	150	14·5	5·2	2	110	1,500	24·52	3 3-prs.	3	27	22
6 boats	Poplar.. ..	1890	130	13·5	6	1	85	1,200	23–24	2 3-pr. Q.F.	2	15	15
4 boats	Poplar.. ..	1880–2	100	12·5	6	1	52	600	20	2 mach.	3	14	10
SECOND CLASS—													
Nos. 1–8 (8 boats) ..	Poplar.. ..	1890	60	9.2	3	1	16	230	17	1 Q.F.	1	10	1.25
Nos. 9–10 (2 boats)	Chiswick ..	1881	60·5	7·5	3·5	1	..	..	17	..	sp.		
VEDETTE BOATS—													
Nos. 1–4 (4 boats) ..	..	1875	55	7	..	..	..	..	..	..	sp.		

The two 150-ft. boats are named Comodoro Py and Murature.

The six 130-ft. boats are named Bathurst, Buchardo, Jorge, King, Pinedo, and Thorne. They have locomotive boilers.

The four 100-ft. boats are named Alerta, Centella, Ferre, and Py.

Austria-Hungary.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
2 boats	Poplar.. ..	1885	135	13·7	5·6	1	95	1,250	22·4	2 Nord.	2	16	28
22 boats	Elbing, Trieste, &c.	1886-9	128	15·9	6·9	1	83	900 / 1,000	17·5 to 21·5	2 mach.	2	15	28
5 boats		Bldg.			..	..	120	..	25				
1 boat	Yarrow ..	Bldg.	147	14·6	..	..	..	..	24	..	2		
SECOND CLASS—													
Nos. 9–34 (26 boats)	Pola, Elbing Chiswick, and Poplar.	..	67	8·5	3·5	1	..	..	18	1 mach.	2		
		..	86	11	4	1	33	450	19·5				
		..	87	10·8	5	1	..	..	18				
		1881	100	12	4·5	1	50	500	21				
Nos. 35–39 (5 boats)	Pola	..	..	..	..	1	63	..	20·5				
Nos. 1–8 (8 boats) ..	Pola and Poplar ..	..	..	..	..	1	27	250	15–18				
1 boat	E. Cowes ..	..	..	..	..	..	11	..	11				

The two 135-ft. boats are named Adler and Falke.

The twenty-two 128-ft. boats are named :—Bussard, Condor, Elster, Flamingo, Gaukler, Geier, Habicht, Harpie, Ibis, Kibitz, Krähe, Kranich, Kukuk, Marabu, Rabe, Reiher, Secretär, Sperber, Staar, Uhu, Weihe, Würger.

The six new Austrian boats are to cost £104,000, or about £17,300 apiece.

Brazil.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Nos. 1–5 (5 boats)	Poplar.. ..	1882	100	12·5	5·5	1	52	600	20	2 mach.	2	16	20
Araguary	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·1	2 Q.F.	4	27	22
Iguatemi	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·4	2 Q.F.	4	27	22
Marcilio Diaz	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·8	2 Q.F.	4	27	22
3 boats	Elbing ..	1892–3	152	17·2	7·9	2	130	2,200	26	2–1 prs.	3	24	30
Piratiny	..	..	130	12	..	..	..	..	10	2–1 pr.	1		
Poty	..	..	126	12	3	..	30	..	18	1–1 pr.	1		
SECOND CLASS—													
Indanhuay (wood)..	New York..	1893	90	10	3	..	17	..	25	1–1 pr.	1	10	
4 boats	..	1883–4	..	..	..	1	17	..	17	..	..		
1 boat	Chiswick ..	1885	63	75	3·2	1	..	..	17			..	2
1 boat	Poplar.. ..	1886	60	8	3	1	14	200	17	..	1		
THIRD CLASS—													
Moxoto	Poplar.. ..	..	60	9·3	..	..	..	..	16	1–1 pr.	1		
5 boats	Chiswick ..	1883	45	6	1·2	1	3·5	..	12-13	1 mach.	sp.		

A torpedo boat among the above, name unknown, was sunk on Nov. 10th, 1893, by a shell during the rebellion.

The three Elbing boats are named Pedro Ivo, Pedro Affonso, and Silva. Two similar boats were lost on the coast towards the close of the late rebellion.

The Piratiny had been the Ericsson submarine gunboat Destroyer ; the Poty had been the yacht Javelin ; the Indanhuay had been the canoe shaped yacht Feiseen. These and the Moxoto were purchased and fitted during the rebellion.

The Piratiny, Poty, Indanhuay, and Moxoto have Howell torpedo-tubes.

The 45 ft. boats are named Alpha, Beta, etc.

During the Brazilian rebellion the Halpine dirigible torpedo was installed on board the cruiser Nictheroy, and was favourably reported upon by her officers. It carries stored electricity and a motor, and is steered by electricity through a wire unwinding from a reel in the machine. In the head is a kind of explosive rocket, which acts like the charge of a submarine gun.

A Sims-Edison dirigible torpedo was, during the Brazilian rebellion, placed on board the cruiser Andrada (*ex* America, *ex* Britannia), together with 4 Howell launching tubes. The Nictheroy (*ex* El Cid) also had Howell tubes ; but none of these were used in action.

Chile.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
3 boats	Poplar.. ..	1881	86	12·5	..	1	25	400	19–20	..	4	15	
5 boats	Poplar.. ..	1881	100	12·5	..	1	35	400	18–19	4 mach.	4	15	9
Sergente Aldea ..	Poplar.. ..	1886	125	13·5	5·5	1	70	800	20	2 Q.F.	4	18	15
Second Class—													
Colocolo	Poplar ..	1880	45	8	..	..	5	40	16	2 mach.	2		
Tucapel	..	1880	50	9	..	..	5	40	16	2 mach.	2		
1 boat	East Cowes	1887	50	..	..	..	..	..	16				
1 boat	East Cowes	1892	60	9·6	5	1	15	270	19	..	1		

The three 86-ft. boats are named Fresia, Lauca, and Quidora.
The five 100-ft. boats are named Glaura, Guale, Janequeo, Rucamilla and Tegualda.

China.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
1 boat	Elbing ..	1886	144·3	16·4	7·5	1	128	1,600	24·2	4 1-pr. revs.	2	20	15
1 boat	Poplar.. ..	1887	128	13	5	1	69	1,000	23·9	{ 3 Q.F., 4 Gatlings }	3	28	15
25 boats	Stettin, &c..	1886–87	110	13	4·9	1	65	1,000	19·5	2 1-pr. revs.	3	16	10
2 boats	Stettin ..	1883	86	10·4	3·4	1	28	650	18·2	2 1-pr. revs.	2	16	12
1 boat	Stettin ..	1884	123·5	21·7	..	..	..	..	19	..	5	16	
4 boats	Germany ..	Bldg.	..		..	..	120	1,250	..	2 Q.F.	2		
Second Class—													
11 boats	Elbing ..	1885–86	85	11·9	4·8	1	27	400	19	..	1	..	5
2 boats	China	..	52	6·7	3·3	1	..	..	16				

Twelve of the above boats are known to have been destroyed during the war with Japan, and at least one other has been taken. The Elbing 144·3ft. boat was named Fu-lung, and the Poplar 128-ft. boat, Choi-ti.

Two of the boats building in Germany will have Yarrow boilers. These boats are under construction at Stettin.

Costa Rica.

Costa Rica has one 62-ft., 15 knot boat.

Denmark.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Delfinen	Chiswick ..	1883	111·5	12·6	6	1	59	620	20	1 mach.	2	14	9
Haien	Chiswick ..	1879	94	10·5	5	1	32	350	21·3	1 mach.	1	12	4
Havhesten	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·8	2 1-pr. revs.	4	20	15
Hvalrossen	Chiswick ..	1884	114	12·6	6·5	1	64	660	18·7	1 mach.	2	14	10
Makrelen	Copenhagen	1893	140	14·2	7	2	112	1,200	..	..	..	..	16
Narhvalen	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·3	2 1-pr. revs.	4	20	15
Nord Kaperen.. ..	Copenhagen	1893	140	14·2	7	2	112	1,200	..	..	..	..	16
Sólóven	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23·3	2 mach.	4	20	14
Sóulven	Havre.. ..	1880	94·8	10·9	3·9	1	37	450	18·1	..	2	12	5
Springeren	Copenhagen	1891	119	13	4·9	1	81	800	18·3	2 1-pr. revs.	2	20	14
Stóren	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23	2 mach.	4	20	14
Sværdfisken	Chiswick ..	1881	110	12	6	1	49	600	20·7	1 mach.	2	14	9
1 boat	..	Bldg.	85	13	..	..	44	360	14	2 mach.	1	..	..
1 boat	..	pro.	..	..	..	..	..	..	..	..	..	..	..
Second Class—													
Nos. 1, 3 (3 boats) ..	..	..	..	..	..	..	8–14	50–70	..	..	..	..	..
Nos. 4, 5 (2 boats) ..	Chiswick ..	1882	63	7·5	2·5	1	15	150	16·9	1 mach.	2	6	1
Nos. 6, 7 (2 boats) ..	Chiswick ..	1884	66·8	8	4·2	1	16	170	15·4	1 mach.	2	6	1·5
Nos. 8, 9 (2 boats) ..	Chiswick ..	1886	69·5	8·1	3·8	1	17	170	15·7	1 mach.	2	6	1
Nos. 10, 11 (2 boats).	Chiswick ..	1888	70·2	8	4	1	18	180	15·8	1 mach.	2	6	1
Nos. 12, 13 (2 boats).	Chiswick ..	1889	78·3	9	4·9	1	24	350	18	1 mach.	2	8	3
1 boat	Chiswick ..	1875	58	7·5	3	1	..	..	16	..	sp.		

The Danes have experimented at Bramsnaes with a new torpedo net-cutter, the invention of a Danish officer. It is carried on the head of the torpedo, and falls off when its work has been done. It was very well reported on by the officials who witnessed the trials.

France.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Sea-Going—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Agile	La Seyne ..	1889	139	14·7	7·7	2	103	1,100	20·4	3–3 prs.	2	26	14
Alarme	St. Nazaire	1888	151	15·7	8·3	2	148	1,400	20·5	2–3 prs.	4	30	40
Aquilon	Normand ..	1894	137·8	14·6	7·9	2	120	2,000	25	2–3 prs.	2	26	17
Archer	Normand ..	1893	138	14·7	6·5	2	120	1,250	21	2–3 prs.	2	26	17
Argonaute..	St. Denis ..	1893	141	16·4	9·3	2	120	1,500	25·1	2–3 prs.	2	25	15
Ariel..	Normand ..	1893	141	16·4	9·3	2	117	1,500	23·5	2–3 prs.			
Audacieux..	La Seyne ..	1889	139	14·7	7·7	2	103	1,100	20·3	3–3 prs.	2	26	14
Aventurier	St. Nazaire..	1888	151	15·7	8·3	2	148	1,400	20·5	2–3 prs.	4	30	40
Averne	Havre ..	1893	141	16·4	9·3	2	117	1,500	24·4	2–3 prs.	2	27	
Cerbère	..	Bldg.	138	14·7	8·2	2	118	1,400	..	2–3 prs.			
Chevalier	Normand ..	1893	144·3	15·7	6·8	2	110	2,700	27·2	2–1 prs.	2	..	17
Corsaire	St. Denis ..	1892	160·5	15	5·4	2	150	2,500	25·5	4–1 prs.	2	..	15
Coureur	Chiswick ..	1888	147·5	14·5	4·6	2	120	1,550	23·28	4 Nords.	2	27	22
Dauphin	Havre ..	1894	141	16·4	9·3	2	115	1,500	25·22	2–3 prs.			
Défi	St. Nazaire..	1888	151	15·7	8·3	2	148	1,400	21	2–3 prs.	4	30	40
Dragon	Normand ..	1892	138	14·7	8·2	2	118	1,400	25	2–3 prs.	2	26	15·5
Eclair	La Seyne ..	1891	144·3	14·7	7·7	2	106	1,100	21·5	3–3 prs.	2	26	17
Flibustier	Normand ..	1893	143	16·4	9·3	2	117	1,500	23·5	2–3 prs.			
Forban	Normand ..	1894	144·2	15·2	10	2	130	3,200	30	2–1 prs.	2		
N 12 (as Forban)	Normand ..	Bldg.	144·2	15·2	10	2	130	3,200	30	2–1 prs.	2		
Grenadier	Normand ..	1892	138	14·7	8·2	2	118	1,400	25·25	2–3 prs.	2	26	15·5
Grondeur	Havre.. ..	1892	147·5	14·5	5	2	114	1,550	24	2–3 prs.	2	27	20
Kabyle	La Seyne ..	1891	144·3	14·7	7·7	2	106	1,100	21·6	3–3 prs.	2	27	17
Lancier	Normand ..	1893	138	14·7	8·2	2	118	1,400	25·79	2–3 prs.	2	26	15·5
Lansquenet	Nantes ..	1893	165·4	15·8	4·2	2	138	2,800	24	2–3 prs.			

France—*continued.*

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
SEA-GOING—*continued.*													
Mangini	..	Bldg.	137·8	14·6	7·9	2	120	2,000	25	2–3 prs.	2	26	17
Mousquetaire	Havre ..	1893	154	15·7	7	2	125	2,100	24·77	2–1 prs.	2	..	18
Orage	La Seyne ..	1891	144·3	14·7	7·7	2	106	1,100	21·7	3–3 prs.	2	26	17
Ouragan	Nantes ..	1887	151	15·7	8·3	2	148	1,400	20	2–3 prs.	4	30	40
Sarrazin	Bourdeaux..	1893	139	14·7	7·7	2	103	1,100	20·5	3–3 prs.	2	26	14
Téméraire	St. Nazaire..	1888	151	15·7	8·3	2	148	1,400	21	2–3 prs.	4	30	40
Ténare	..	Bldg.	137·8	14·6	7·9	2	120	2,000	25	2–3 prs.	2	26	17
Tourbillon	Bourdeaux ..	1892	139	14·7	7·7	2	103	1,100	20·5	3–3 prs.	2	26	14
Tourmente	St. Denis ..	1893	141	16·4	9·3	..	120	1,500	24·6	2–3 prs.	2	25	15
Turco	St. Denis ..	1892	138	14·7	8·2	2	118	1,400	21·3	2–3 prs.	2	26	15·5
Véloce..	Havre	1891	147·5	14·5	5	2	114	1,550	23·6	2–3 prs.	2	27	20
Zouave	St. Denis ..	1892	138	14·7	8·2	2	118	1,400	21·3	2–3 prs.	2	26	15·5
FIRST CLASS—													
Balny	Normand ..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	
Bouët-Villaumez	St. Denis ..	1888	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	
Capt. Cuny	..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	
Capt. Mehl	..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	
Challier	..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	
Dehorter	St. Denis ..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	
Deroulède	Normand ..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	
Doudart de Lagrée	Normand ..	1886	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	
Edmond Fontaine	St. Denis ..	1888	134·5	11	7·2	1	67	700	20	2–1 pr. rev.	2	21	
151 (*ex* G. Charmes) ..	La Seyne ..	1886	132·5	12·5	6·6	..	74	560	18·8	2–1 prs.	..	23	
126–129 (4 boats)	Normand ..	1888–9	118	13·2	8·7	2	78	1,250	21	2–1 prs.	2	21	10
145–149 (5 boats)	Normand ..	1891–3	118	13·2	8·7	2	75	1,300	23·9	2–1 prs.	2	21	10
152–154 (3 boats)	Normand ..	1892–	118	13·2	8·7	2	75	1,300	24·6	2–1 prs.	2	21	10
155–157 (3 boats)	Bourdeaux ..	1893	118	13·2	8·7	2	79	1,300	23	2–1 prs.	2	21	10
158–160 (3 boats)	Cail	1893	118	13·2	8·7	2	79	1,300	23	2–1 prs.	2	21	10
161–163 (3 boats)	St. Nazaire..	1892	118	13·2	8·7	2	79	1,300	23	2–1 prs.	2	21	10
164–166 (3 boats)	La Seyne ..	1892	118	13·2	8·7	2	79	1,300	23	2–1 prs.	2	21	10
167–169 (3 boats)	Creusot ..	1892	118	13·2	8·7	2	79	1,300	23	2–1 prs.	2	21	10
170, 171 (2 boats).. ..	Normand ..	1893–4	118	13·2	8·7	2	79	1,200	23–24	2–1 prs.	2	21	10
172–176 (5 boats)	Creusot ..	1893–4	118	13·2	8·7	2	79·5	1,390	23–24	2–1 prs.	2	21	10
177–179 (2 boats)	Havre.. ..	1893	118	13·2	8·7	2	79·5	1,300	23–24	2–1 prs.	2	21	10
180, 181 (2 boats).. ..	Creusot ..	1893–4	118	13·2	8·7	2	79·5	1,300	23	2–1 prs.	2	21	10
182–191 (10 boats) ..	Normand, etc.	1893–4	118	13·2	..	..	79·5	..	24	..	2	21	10
192–200 (9 boats)	Havre, etc.	1894–95	118	13·2	8·7	2	79·5	1,300	23·5	2–1 prs.	2	21	10
201–205 (5 boats).. ..	..	Bldg.	121·4	13·6	..	2	80	1,450	22·5	2–1 prs.	2	21	10
SECOND CLASS—													
26	..	1878	108	11	5·6	1	45	400	19	..	2	16	
27	..	1878	104·4	10·6	6·1	1	44	400	19	..	2	16	
28	..	1878	111·5	11	5·6	1	44	400	19	..	2	16	
60–64 (5 boats)	..	1878–85	108·2	10·3	6·1	1	45	400	19	..	2	16	
65, 66, 68 (3 boats) ..	..	1878–85	108·2	10·7	6·4	1	49	500	20	..	2	16	
69–74 (6 boats)	..	1878–85	108·2	10·7	6·5	1	50	500	20	..	2	16	
75–109 (35 boats)	Cail, etc. ..	1885–92	114·7	10·6	6	1	56	525	20	2–1 prs.	2	16	10
111–125 (12 boats) ..	La Seyne, etc.	1885–90	114·7	10·6	6	1	56	525	20	2–1 prs.	2	16	10
130–144 (15 boats) ..	Normand, etc.	1889–90	111·5	11·4	6	1	52·8	520	21	2–1 prs.	2	16	
150	..	..	114·7	10·6	7	1	54	520	20	2–1 prs.	2	16	10
Q. 1–Q. 4. (4 boats) ..	..	Bldg.	..	..	..	..	53	700	20·5	2–1 prs.	2	16	
THIRD CLASS—													
8–19 (12 boats)	Various Firms in France and England.	1877–82	86	10·2	5	1	27	200–450	16–19	..	..	10	
20			87	10·8	5	1	33			..	..	10	
22, 23 (2 boats)			87·6	10·4	5·2	1	30			..	..	10	
24, 25 (2 boats)			88·5	10·4	6	1	30			..	..	10	
31, 32 (2 boats)			85·5	10·4	3·8	1	27			..	..	10	
33–36 (4 boats)			89	10·4	6	1	32			..	..	10	
37–40 (4 boats)			87	10·8	5	1	32			..	..	10	
41, 42 (2 boats)			87	10·8	6	1	33			..	..	10	
43, 44 (2 boats)			89	10·4	5·7	1	32			..	..	10	
47			87	10·8	5	1	33			..	..	10	
48			89	10·4	5·8	1	32			..	..	10	
49, 50, 53 (3 boats) ..			87	10·8	5	1	32			..	..	10	
54, 55 (2 boats)			91	10	6·1	1	32			..	..	10	

France—*continued.*

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
VEDETTE BOATS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
(1 boat) (aluminium)..	Poplar ..	1894	62·3	9·1	..	1	14	210	20·5	..	1	8	
(5 boats) (aluminium)	France ..	Bldg.	59	9·4	4·8	1	14	210	15·3	..	1	8	
29, 30 (2 boats)	Chiswick ..	1876	67	8·5	3·5	1	..	..	18	..	1	8	
56, 57 (2 boats)	Chiswick ..	1879	59	7·5	3·5	1	12	50	16	..	..	..	
58, 59 (2 boats)	Chiswick ..	1881	63	7·5	3·5	1	11	50	17	..	..	..	
SUBMARINE—													
Goubet	..	1888	18·3	3·2	5	..	6	..	5	..	..	2	
Gustave Zédé	Toulon ..	1893	131	..	..	1	266	720	14	..	..	8	
Gymnote	Mourillon ..	1888	59	5·9	5·9	1	29·5	60	4–6	..	..	4	
Morse..	Cherbourg ..	Bldg.	..	..	..	..	146						

NOTE.—In the above list Havre *means* the Chantiers of the Cie. de la Méditerranée at that place, as distinct from the yard of MM. Normand, which is also at Havre.

The Lansquenet, built after the plans of Commandant du Quenyo, resembles in her general lines a Schichau boat. She had several troubles, especially one with a cylinder, during her first trials, and was at length returned to her builder, M. Oriole, for alterations.

During the manœuvres the Grondeur damaged her bow somewhat seriously.

The new French sea-going boats have an endurance of 1,800 miles at 10 knots, and one of 200 miles at full speed. The Mangini and Ténare will be supplied with Normand boilers. The boats will cost £26,377 apiece, and are to be delivered in 1896.

Among trial speeds attained by the more recent French first-class boats may be mentioned:—24·16 knots by No. 145; 24·26 knots by No. 146; 23·76 knots by No. 153; 23·15 knots by No. 154; 24·38 knots by No. 171; 23 knots by No. 177; 24 knots by No. 182; and 24·5 knots by No. 183.

The new French first-class boats, which will cost £16,600 apiece, and which are to be delivered in 1896, will have an endurance of 1,800 miles at 10 knots.

Of the six vedette boats, intended for the torpedo depôt ship Foudre, one was built at Poplar by Mr. Yarrow in 1894, and at her trials attained the extraordinary speed of 20·5 knots with 591 revolutions. Her hull weighs but about 2¼ tons, yet, being of an aluminium alloy, is 25 per cent. stronger than that of the usual steel boat of the same size. The remaining five boats, also of aluminium alloy, are to be built in France at a cost of £5,440 each; but the contracts will not require a speed of more than 15 33 knots.

On July 6th, 1894, the French 114·7 ft. boat No. 120, a transformed boat by M. Oriole, having locomotive boilers, burst a boiler while off Toulon, and seriously injured four men, of whom two afterwards died.

As sea-going craft the French 108·2 ft. boats are very uncomfortable, if not dangerous. In the winter of 1894-95, No. 64 of this class experienced bad weather on a passage from Algiers to Marseilles, and had one man washed overboard and another badly injured. Upon reaching her destination all the other people had to be handed over to the care of a doctor.

On January 29th, 1895, the French 111·5 ft. boat, No. 135, ran ashore at Calvi in a gale, and was badly damaged. On the 28th of the previous August, the same boat, off Pietranera, ran down and cut in two the small barque Assomption.

French torpedo boats have of late been supplied with leak or shot-hole stoppers known as Paillet-Colomés.

The French 108·2 ft. boat, No. 70, met with a bad boiler accident in April 1894, and was towed into Cherbourg by No. 90.

Early in 1895 the French Government ascertained by practical experience that second-class torpedo-boats can move between Gravelines and Calais or Dunquerque without going to sea at all, so that even a general and close blockade of the coast would not prevent the boats at one place from proceeding to the others. The waterways used are the Canals of Bourbourg, La Colme, and Calais, and the River Aa. Boat No. 60, 108·2 ft. long by 10·7 ft. broad, and drawing 6·1 ft. of water made the passage with ease, in spite of the unusual quantity of ice in the waterways traversed.

The submarine-boat Gustave Zédé has had much trouble from the beginning with her accumulators, and on May 30th, 1894, while the vessel was lying in the Missiessy Basin at Toulon, and they were being charged, a series of explosions, followed by a fire, occurred on board. She was at once battened down. On the following day, an examination disclosed that the machinery had not suffered, but that all the after accumulators had been partially or wholly destroyed. This was the second accident of the kind. The first had occasioned an expenditure of nearly £8,000. It is supposed that short circuiting had set fire to the valvoline in the accumulators. Repairs were made at great further cost, and towards the end of the year the boat began a succession of trials. On Dec. 1st she was thrice submerged to depths of from 45 to 65 feet, while moving at from 6 to 8 knots speed. On other occasions she remained below for several hours, launched torpedoes while submerged, etc. The people on board more than once suffered serious inconvenience, and it seems to be admitted that, apart from that, the difficulty of seeing under water has yet to be got over. Another recognised defect of the Gustave Zédé is that she is too long, and too large generally. Engineers concerned in the construction of the Morse attended the trials at Toulon, and will embody in the newer craft all the useful suggestions to be derived from the experiences of the older one; yet certainly in the Gustave Zédé, and probably in the Morse as well, the French will have a vessel of little or no practical value; and, although all efforts to solve the numerous problems presented by submarine navigation are exceedingly interesting, there is a general impression that the large sums spent on the Goubet, Gymnote, Gustave Zédé, and Morse have, so far as real progress is concerned, been almost wasted. The Gustave Zédé, fitted with new accumulators, is to undergo further trials in the autumn of 1895.

During 1894 the cruiser Surcouf experimented at Cherbourg with the Drezewecky controllable torpedo, which worked fairly well when the vessel was at very low speed, but was not easily managed when the vessel had a speed of 12 knots.

Germany.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DIVISION BOATS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
D 1, D 2 (2 boats)	Elbing ..	1887	185·3	21·6	9·8	2	250	1,800	21	6 1-pr. revs.	3	48	50
D 3, D 4 (2 boats)*	Elbing ..	1888	188	22	9·8	2	300	2,000	21	{ 4 6-pr. Q.F. 2 1-pr. revs. }	3	48	90
D 5, D 6 (2 boats)*	Elbing ..	1888–9	190	23·4	10·6	2	320	3,500	23	{ 4 6-pr. Q.F. 2 1-pr. revs. }	3	48	90
D 7, D 8 (2 boats)*	Elbing ..	1890	213	..	..	2	350	4,000	26	6 Q.F.	3		
D 9, D 10 (2 boats)*	Elbing ..	1894	..	..	..	2	380	..	26	6 Q.F.			
D 11	..	1894											
FIRST CLASS—													
S 1—S 64 (64 boats)	Elbing ..	1883–90	{128 121·2	15·7 15·6	6·7 6·7}	..	85–88	1,000	19–22	2 1-pr. revs.	2	..	17
S 65—S 74 (10 boats)	Elbing ..	1891–2	144·3	16·4	..	..	110	1,500	24	..	3		
S 75	Elbing ..	..	..	..	..	2	145	..	26	..	3		
S 76—S 80 (5 boats)	Elbing ..	1891–?	144·3	16·4	..	2	125	2,500	25	..	3		
S 81—S 96 (16 boats)	Elbing ..	1893–4	..	..	..	2	110–50	..	26	..			
8 boats	Elbing ..	Bldg.	144·3	18	..	2	140	1,500	22	2 1-pr. revs.	3	..	32
V 1, V 2 (2 boats)	Stettin ..	1884	124·6	..	..	..	}		..	..	2		
V 3, V 4 (2 boats)	Stettin ..	1884	..	..	..	..	} 75	550 }	..	..	2		
V 5—V 10 (6 boats)	Stettin ..	1884	..	..	..	..	} 90	1,000 }	19	..	2		
G 1,	Gaarden ..	1885	124·6	15·7	6·6	..	88	1,000	19	2 1-pr. revs.	2	17	
Y 1,	Poplar ..	1884	120	12·5	5·5	1	65	650	19	2 1-pr. revs.	2	15	25
T 1, T 2 (2 boats)	Chiswick, &c.	1884	117·7	12·5	6·2	1	80	..	20·2	2 1-pr. revs.	2	15	22
H 1,	Kiel (Howaldt)	1886	..	..	..	..	80	1,000	20	2 1-pr. revs.	2		
K 1,	Kiel (Dockyard)	1887	118·1	13·4	5·9	..	85	1,000	22	2 1-pr. revs.	..	18	
SECOND CLASS—													
W 3—W 6 (4 boats)	Bremen ..	1884	103	12·8	..	..	..	650	18·5	2 1-pr. revs.	2	14	13
3 boats	..	1893	..	..	..	..	88	..	22				
2 boats	..	1893	..	..	..	..	90	..	3				
VEDETTE BOATS—													
13 boats	..	..	..	..	..	..	13·5	..	18				
2 boats	..	..	..	..	..	..	..	..	16				
1 boat	Chiswick ..	1884	63	8	4·3	1	..	..	15·5	1 mach.	2		

* These boats also appear in Alphabetical List.

The German Government intends, when funds are forthcoming, to complete the strength of its torpedo flotilla to 12 division boats and 96 modern boats of the first-class, and to keep it there. This arrangement will provide 12 divisions, each of one division boat and eight torpedo boats.

The engines of D 7 broke down during the manœuvres of 1894, and had to undergo very extensive repairs.

In order to test the behaviour of the latest type of German sea-going torpedo-boat, S 68 and S 69 were sent out on February 10th, 1894, in face of a heavy gale blowing on shore. S 68 drew 4 ft. 11 ins. forward, and 8 ft. 0 ins. aft. S 69 drew 5 ft. forward, and 8 ft. 8 ins. aft. The trial was made from Wilhelmshaven. Past the Minsener Sand Light Ship a speed of 16 knots was maintained. Outside a heavy ground swell was running, and the speed was reduced to 10 knots. At this speed good weather was made, the conning-tower was quite habitable, and it was not found necessary to steer from aft. The engines moreover worked smoothly, the screws seldom came out of the water, and there was no occasion for throttling the steam. The sea and wind were at one time so strong that it took the boats two hours to make 7½ miles. When S 69 was about two cables astern of S 68, she could not be seen from her owing to the seas. The boats were then slowed down and kept off in order to test them while lying to. With the wind two or three points on the bow, they behaved well and shipped little water. Indeed, the deck aft remained dry. The boats were next battened down and run before the seas at 16 knots. Only one heavy sea came on board while falling off. While scudding at 14 knots a sea came on board to the height of the after conning-tower gratings, nor did the boats at that speed steer so well as at 16 knots. The good sea-going qualities of the class were held to be fully established. The earlier boats, similarly tested, were not equally satisfactory, the screws racing badly in spite of all that could be done, and the people suffering extremely.

Greece.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
6 boats	Stettin ..	1885	128	15·3	5·4	1	85	1,050	19	4 1-pr. revs.	..	20	20
6 boats	Poplar.. ..	1881	100	12	4·2	1	48	600	19	2 1-pr. revs.	2	12	9
4 boats *	La Seyne ..	1880	72	13	5·5	1	52	225	..	..	..	..	10
5 boats *	La Seyne ..	1881	89	11	3·1	1	35	500	17·5	..	..	..	5
2 boats *	Poplar.. ..	1878	75	10·8	2·5	..	18	295	16·2	..	..	..	1·5
8 boats *	..	..	..	..	..	..	21	..	16				
20 boats	Various ..	..	..	..	..	..	..	..	..	..	sp.	..	..

* These nineteen boats are named as follows; Aigeleia, Aspis, Ambrakia, Chios, Delos, Ionia, Kallithea, Kypros, Mykale, Mitylene, Nauplia, Nauptyria, Persephone, Pherenike, Rhodos, Samos, Sappho, Sphinx, and Terpsichore.

Italy.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
5 boats	Elbing ..	1888	152	17·2	7·9	2	130	2,200	26·6	2 3-pr. Q.F., 1 1-pr. Q.F., 1 1-pr. rev.	3	24	40
Nos. 78, 79 (2 boats)	Venice ..	1887	135	14	5·3	2	110	1,600	24	1 1-pr. Q.F., 1 1-pr. rev.	5	20	30
SECOND CLASS—													
Nos. 76, 77 (2 boats)	Poplar.. ..	1887	140	14	5	2	100	1,600	25	2 3-pr. Q.F., 1 1-pr. rev.	5	20	30
Nos. 84–104, 106–111 (27 boats)	Elbing and Italy ..	1887–88	127·7	15·6	6·8	1	85	1,000	22·5	2 1-pr. Q.F.	2	17	7
Nos. 112-116, 118-135 (23 boats)	Elbing and Italy ..	1889–92	127·7	15·6	6·8	1	85	1,100 / 1,200	23	..	2	17	17
No. 117	..	1895	131·2	16·4	..	1	85	1,000	..	2 1 pr. Q.F.	2	17	17
Nos. 136–146 (11 boats)	Italy	1893–94	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 147–153 (7 boats)	Italy ..	1894–5	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
12 boats	Italy	Bldg.	131·2	16·4	7	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 56–75 (20 boats)	Elbing and Italy ..	1885–87	127·7	15·6	6·8	1	65	1,000	22·5	2 1-pr. Q.F.	2	17	17
THIRD CLASS—													
No. 22	Poplar.. ..	1882	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	10
No. 25	Poplar.. ..	1882	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	10
Nos. 26–55 (30 boats)	Chiswick and Italy ..	1882–86	100	11·7	5·3	1	34	430	21·3	1 1-pr. rev.	2	11	7
Nos. 80–83 (4 boats)	Genoa	1888	101·6	..	..	1	34	430	21	1 1-pr. rev.	2	11	7
Nos. 23, 24 (2 boats)	Chiswick ..	1881	92	10·5	4·9	1	33	470	21·8	1 1-pr. rev.	2	11	7
No. 11	..	1883	..	..	..	1	31	250	..	..	..	10	
FOURTH CLASS.													
Veloce	Chiswick ..	1878	76	10	3·5	1	..	..	18	1 1-pr. rev.	..	10	
Nos. 1, 2 (2 boats)	Poplar.. ..	1879	86	11	4·5	1	25	420	21	..	..	10	7
Nos. 3–10, 16–21 (14 boats)	Chiswick ..	1883	63	7·5	2·5	1	13	170	16·5–17	1 1-pr. rev.	2	10	
Nos. 12–15 (4 boats)	Chiswick ..	1883	66	..	3·8	1	16	250	19·2	1 1-pr. rev.	2	10	
14 boats	E. Cowes ..	..	..	..	..	..	8–14	..	12–16	..	..	..	
SUBMARINE—													
Pullino	..	1893	..	..	..	..	..	..	8				

The five 152 ft. Italian boats are named Aquila, Avvoltoio, Falco, Nibbio, and Sparviero.

The Italian Pullino submarine boat underwent various trials at Spezia in 1894, but particulars are unobtainable.

The Italian first-class boat S. 117 was wrecked in December 1894, near Brindisi, and became a total loss. The crew was saved. A royal decree of Dec. 30th conferred her number upon the new boat previously known as S 154.

Some destroyers of 28 knots, and several 150 ton boats of 25 knots, are projected. They will have water-tube boilers, will be partially constructed of aluminium, and will burn liquid fuel on the Cuniberti system.

Italy—*continued.*

In September 1894 the Avvoltoio ran upon a rock near Genoa, knocked a hole in herself 36 feet long, tore off two blades of one of her screws, and injured one of her torpedo-tubes. She was, however, recovered and repaired at Spezia.

The Italian torpedo-boats are thus attached to the three maritime arrondissements: Spezia, Nos. 3, 4, 5, 6, 11, 18, 20, 22, 24, 25, 26, 31, 32, 36, 38, 44, 45, 46, 49, 50, 51, 52, 53, 56, 57, 58, and 60 to 100 inclusive. Naples and Taranto, Nos. 14, 17, 27, 28, 33, 39, 40, 41, 42, 43, 47, 48, 54, 55, 59, and 101 to 126 inclusive. Venice, Nos. 1, 2, 7, 8, 9, 10, 12, 13, 15, 16, 19, 21, 23, 30, 34, 35, 37, and 127 to 153 inclusive. No. 29 appears to be missing.

A royal order issued in 1894 directed the Italian torpedo-boats to be rated in four classes, viz. I. boats of above 100 tons, II. boats of from 60 to 100 tons, III. boats of from 30 to 60 tons, and IV. boats of below 30 tons. The Italian boats are, in consequence, here classified accordingly.

The Italian torpedo-boat divisions in commission are organised for 1895 as follows: with the Squadra Attiva, Nos. 63, 64, 103, 111, 133 and 137; with the Squadra di Riserva, Nibbio, Aquila, Sparviero, Falco, and Nos. 62, 74, 104, 110, 116, 117, 124, 125, 127, 144, 146, and 153; and at Spezia, No. 147.

Japan.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Kotaka	Poplar.. ..	1886	170	19·6	5	2	190	1,400	19	4 mach.	6	..	50
10 boats	Creusot ..	1889	114·7	10·6	6	1	56	525	20	2 1-prs.	..	16	
7 boats	Kobe	1889	114·7	10·6	6	1	56	525	20	2 1-prs.	..	16	
4 boats	Poplar.. ..	1879	100	12·5	..	1	40	620	20	..	..	..	3
1 boat	Normand ..	1891	118	13·2	8·7	2	75	1,300	23	2 1-prs.	2	21	10
16 boats	Onohama ..	1892–93	..	..	..	..	30						
2 boats	Elbing ..	1891	125	16	..	1	90	1,300	23	3 1-prs.	3		24
17 boats	Kobe	Bldg.	..	..	..	..	..	..	..	..	..	..	..

One of the above boats sank off Yokohama during the manœuvres of 1893 but was recovered.

Another of the above was lost on the night of February 4th, 1895, while attacking the Chinese Fleet at Wei-hai-wei.

The Kotaka, which did good work both at Port Arthur and at Wei-hai-wei, has her machinery compartment armoured with 1-in. steel plates, the rest of the hull being very minutely sub-divided by watertight bulkheads.

Mexico.

Mexico has five first-class boats building or projected.

Netherlands.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Ardjoeno	Poplar.. ..	1886	125	13	6	1	83	800	21	2 1 prs	2	16	10
Batok	Amsterdam	1887	125	13	6·9	1	83	725	20	2 1-prs.	2	16	10
Cycloop	Amsterdam	1887	125	13	6·9	1	83	680	20	2 1-prs.	2	16	10
Dempo	Amsterdam	1887	125	13	6·9	1	83	760	20	2 1-prs.	2	16	10
Empong	Poplar.. ..	1888	128	13	6·2	1	91	1,100	24·1	2 1-prs.	3	16	15
Etna	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Foka	Amsterdam	1888	128	13	6·2	1	90	1,000	22·1	2 1-prs.	3		
Goentoer	Amsterdam	1888	128	13	6·2	1	90	950	21	2 1-prs.	3		
Habang	Amsterdam	1888	128	13	6·2	1	90	930	21·7	2 1-prs.	3		
Hekla	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Idjen	Amsterdam	1889	128	13	6·2	1	90	840	20·6	2 1-prs.	3		
Krakatau	Amsterdam	1889	128	13	6·2	1	90	750	19·1	2 1-prs.	3		
Lamongan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Makjan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Nobo	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
13 boats	..	pro.	160	..	..	..	..	..	..	..	..	..	..
4 boats	..	pro.	100	..	..	..	..	..	..	..	..	..	..
Second Class—													
Nos. 1, 2, 4–20 (19 boats)	Chiswick, etc.	1878–86	76 / 79	10·3	5·2	1	29	250	18	1 1-pr.	2 sp	..	3
Nos. 3,21,22 (3 boats)	..	1890	83·6	10·5	5·1	1	37	460	17·9	1 1-pr.	1	..	3
1 boat	East Cowes	1883	45·5	9·7	..	1	..	..	12	1 mach.	1		
Indian Fleet—													
Cerberus	Flushing ..	1888	125	13	6·9	1	83	912	21·2	2-1 prs.	2	16	
1 boat	..	1891											
3 boats	..	1893–94	125	..	..	..	83	..	21·5	..	2		

Norway.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Lyn	..	1882	94·2	9·7	2·5	1	36	430	18	..	1		3
Od	..	1882	97·5	11	5·6	1	40	450	18	..	1	..	3
Orm, Otter (2 boats)	..	1887	108·2	12·2	5·6	1	40	500	20	..	2	..	3
Pil, Rask (2 boats)..	..	1887	101·7	11·8	5·6	1	40	500	20	..	2	..	3
Snar	..	1887	104·9	11·8	5·6	1	40	500	20	..	2	..	3
Springer	..	1887	97·5	11·6	5·6	1	40	450	19	..	2	..	3
Varg (8), Raket (9)	Christiania..	1894	111·5	12·4	..	..	43	..	..	..	2	..	..
Second Class—													
Rasp	Chiswick ..	1873	58	7·5	3·9	1	16	..	18	..	2		
Ulven	..	1878	56	..	..	1	16	..	9	..	sp.		
2 boats	..	..	..	..	..	..	20	..	12	..	..		

The Varg has Thornycroft, and the Raket, Du Temple boilers.

Portugal.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
5 boats (5–9)	Elbing ..	1890–92											
Espadarte (1)	Poplar.. ..	1881	8[illegible]	11	5	1	31	450	19·7	2 mach.	2	10	10
Nos. 2, 3, 4 (3 boats)	Poplar.. ..	1886	120	12·5	5·5	1	60	700	20	2 mach.	2	16	18
Fulminante	Blackwall ..	1880	75	15	2·6	2	40	150	11·5	2 mach.	..	..	8
1 boat	..	..	..	..	..	..	25						
12 1st class boats ..	..	pro.	..	..	..	..	..						
23 2nd& 3rd class boats	..	pro.	..	..	..	..	..						
Submarine—													
Plongeur	..	1892	72·1	11·5	..	..	..	..	6				

Roumania.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Naluka	Havre.. ..	1888	120·7	11·3	6·9	1	55	500	21	1 1-pr. rev	2	..	12
Sborul	Havre.. ..	1888	120·7	11·3	6·9	1	..	500	21	1 1-pr. rev.	2	..	12
Smeul	Havre.. ..	1888	120·7	11·3	6·9	1	..	500	21	1 1-pr. rev.	2	..	12
Second Class—													
Szimul	Poplar.. ..	1882	63	8	3	1	15	150	16·5		..	8	1
Vulturul	Poplar.. ..	1882	63	8	3	1	15	150	16·5		..	8	1

Russia.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
BALTIC SEA.													
DESTROYER—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Sokol	Poplar	Bldg.	190	18·6	..	..	..	..	29				
FIRST CLASS—													
Aspen	Kolpiro	Bldg.	127 9	15·7	6·9	1	98	1,250	21	..	2	..	17
Abo	Elbing	1886	128	15·7	7·5	1	87	900	22·2	4 1-pr. revs.	2	13	17
Bjerke	Putiloff	1890	136·5	13	7·8	..	81	1,100	21				
Borgo	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Dago	Abo	1891	152	13	8·3	..	100	1,000	19				
Domeness	Putiloff	Bldg.	127 9	15·7	6·9	1	98	1,250	21	..	2	..	17
Eckness	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Hapsal	Putiloff	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Hogland	Itschora	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Kotka	Abo	1891	152	13	8·3	..	100	1,000	19				
Kotlinj	St. Petersburg	1885	124·2	12·9	5·9	2	67	500	16·5	2 1-pr. revs.	2	16	15
Kronschlot	Kolpiro	1891	152	13	8·3	..	100	1,000	19				
Lachta	Elbing	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Libawa	Elbing	1886	128	15·7	7·5	1	87	1,000	22	4 1-pr. revs.	2	13	17
Louga	Elbing	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Moonsund	Putiloff	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Nargen	Itschora	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Narwa	Elbing	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Pernow	Normand	1892	138	14·7	9·9	2	118	..	25·4	2 mach.	2	26	
Revel	Normand	1886	152·3	12·3	8·1	1	96	780	22	2 Q.F.	2	23	30
Rochensalm	Putiloff	1890	136·5	13	7·8	..	81	1,100	21				
Seskar	Kolpiro	1891	152	13	8·3	..	100	1,000	19				
Sestoresk	Normand	1893	118	13·2	8·7	2	130	1,900	25	2 1-prs.	2	21	10
Sweaborg	Normand	1886	152·3	12·3	8·1	1	96	780	19·7	2 Q.F.	..	..	30
Tosna	Putiloff	1893	127·9	15·7	6·9	1	98	1,250	21	..	2	13	17
Transund	Kolpiro	Bldg.	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Viborg	Clydebank	1886	144·5	17	8·1	2	126	1,400	20	2 3-pr. revs.	3	24	45
Vindawa	Elbing	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17
Vzriw	St. Petersburg	1877	118	16	10·9	1	160	800	14·5	4 Q.F.	1	18	16
N.	Elbing	1893	152	17									
8 boats	St. Petersburg	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
2 boats	Putiloff	1894	138	14·7	9·9	2	118	..	25	2 mach.	2	26	
2 boats	St. Petersburg	Bldg.	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
6 boats	St. Petersburg	Bldg.	138	14·7	9·9	2	118	..	25	..	2	26	
SECOND CLASS—													
21 boats (Galka class)	Elbing and Russia	1880 &c.	74·7	8·9	5	1	30	220	16	..	2	14	3
21 boats (Woron class)	Elbing and Russia	..	66	11·1	..	1	..	260	17				
1 boat	Poplar	1888	60	8·5	3	1	16	240	17·5	..	2	..	1
BLACK SEA.													
FIRST CLASS—													
A. B. C. (3 boats)	Nicolaieff	1893	126	..	..	..	81	..	21				
Adler	Elbing	1890	152·0	17·2	7·9	2	130	2,200	27·4	2 1-prs.	3	24	40
Anakria	Elbing	1890	128·0	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Anapa	Odessa	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Aitodorj	Odessa	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Batoum	Poplar	1880	100	12·5	5·5	1	40	500	22	2 1-pr. revs.	2	12	9
D. E. (2 boats)	Sebastopol	1893	128	..	..	..	85	..	22				
Gagri	Claparède	1883	120·6	13·3	7	1	78	600	18	2 1-pr. revs.	2	13	12
Gelendshik	La Seyne	1883	122·7	12·4	6·2	1	73	560	18	2 1-pr. revs.	2	13	11
Ismail	Nicolaieff	1886	128	15·7	7·5	1	87	900	20	2 1-pr. revs.	2	13	17
Itzvar	Odessa	1891	..	..	..	..	81	1,100					
Kodor	Elbing	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17
Kilia	Elbing	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Novorossisk	Elbing	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Poti	Normand	1883	124·6	11·9	6·7	1	72	570	18·5	2 1-pr. revs.	2	13	11
Reni	Elbing	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Sookhoum	Chiswick	1883	113	12·5	6	1	64	700	19.5	2 Nords.	2	13	10
Tchardak	Elbing	1886	128	15·7	7·5	1	87	900	2[illegible]	4 1-pr. revs.	2	13	17
Yalta	Elbing	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
4 boats	Nicolaieff	Bldg.	..	..	..	..	..	..	..	..	..	..	..

Russia—*continued.*

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
SECOND CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Istcheritza	Sebastopol ..	1878	62·3	9·7	3·9	1	24	220	15	..	..	10	
Karabin	Elbing.. ..	1877	64·3	8·4	2	1	11	120	15	..	..	8	
Kefal..	Chiswick ..	1880	60·5	7·5	3·5	1	..	..	16·8	..	..	8	
Scheglensk	Sebastopol ..	1878	59·3	9·5	3·9	1	24	220	15	..	..	10	
Schehouka	Sebastopol ..	1878	59·3	9·5	3·9	1	24	220	15	..	..	10	
Scoombia	Odessa.. ..	1878	64·3	10	4	1	25	220	15	..	..	10	
Soroka	St. Petersburg	1878	62.3	9·7	3·9	1	24	220	15	..	..	10	
Soulin	..	1877	60	9·7	3·9	1	24	210	15	..	..	10	
Sultanka	Odessa.. ..	1878	64·3	10	4	1	25	220	15	..	..	10	
1 boat	Poplar	1877	75	10	..	..	..	..	..	..	..	..	
50 boats (Woron Class)	Elbing, etc.	..	66	11·1	..	1	..	260	17				
SIBERIAN FLOTILLA.													
Forel..	..	..	71·5	6·5	3·3	1	23	220	16				
Jantchiche	Elbing.. ..	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
Podorosnik	..	..	71·5	6·5	3·3	1	23	220	16				
Sisik	..	..	71·5	6·5	3·3	1	23	220	16				
Skorpion	..	..	71·5	6·5	3·3	1	23	220	16				
Sootchena..	Elbing.. ..	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
Sterliad	..	..	71·5	6·5	3·3	1	23	220	16				
Strauss	..	..	71·5	6·5	3·3	1	23	220	16				
Sunguri (*ex* Hogland)	Abo	1890	152	16	7·9	2	140	1,800	22				
Ussuri (*ex* Nargen)	Abo	1890	152	16	7·9	2	140	1,800	22				

The destroyer Sokol will have Yarrow water-tube boilers.
The two 128-ft. boats building at St. Petersburg are to be named Dagerord and Polangen.
During the earlier trials of the Sestoresk, one of her boiler tubes burst, wounding three men.
The boats of the Woron class may be regarded as useless.

Spain.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
A.	..	1893	147·5	14·6	..	2	97	1,600	25	3 3-prs.	2	..	25
Acevedo	Chiswick ..	1885	117·7	12·5	6·2	1	63	660	20·1	2 mach.	2		
Ariete	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	26·1	4 3-pr. Q.F.	2	..	25
Azor	Poplar.. ..	1887	134·5	14	6	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
B.	..	1893	135	14	6	1	105	1,600	24	4 3-prs.	3	23	25
Barcelo	Normand ..	1886	126	10·9	..	..	66	800	19·5	2 1-in. Nord.	2		
Bustamente	Normand ..	1887	126	10·9	..	..	63	800	..	3 3-prs.	2		
C.	..	Bldg.	147·5	14·6	..	2	97	1,600	25	3 3-prs.	2	..	25
D.	..	Bldg.	147·5	14·6	..	2	97	1,600	25	3 3-prs.	2	..	25
Ejercito	Kiel	1887	111·5	13	3·3	..	60	1,000	25	2 mach.	2		
Habana	Chiswick ..	1887	127·5	12·5	6	1	59	730	21·3	1 mach.	2		
Halcon	Poplar.. ..	1887	134·5	14	..	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
Julian Ordoñez ..	Chiswick ..	1885	117·7	12·5	6·2	1	65	660	20·1	2 1-in. Nord.	2		
Orion..	Gaarden ..	..	125	15·5	3·5	1	85	1,000	21·5	2 1-pr. revs.	2	18	16
Rayo..	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	25·5	4 3-pr. Q.F.	2	..	25
Retamosa..	Poplar.. ..	1886	118	12·5	5·5	1	70	700	20·5	2 1-in.	2	17	20
Rigel..	Bremen ..	1883	105	12·3	3·3	1	57	..	19	1 1-pr. rev.	2	18	13
Seza	Ferrol.. ..	1885	126	..	..	..	85	..	14				
20 boats	..	{1893& Bldg.}	..	..	..	..	60						
SECOND CLASS—													
Aire	Spain	1883	43·4	10·2	3	2	25	175	8	1 3·1-in.	..	16	1
Castor	La Seyne ..	1878	76·2	9·7	2·3	..	23	265	19	..	..	14	1·5
Pollux	Poplar.. ..	1879	84·5	10·7	4·6	..	33	450	19·5	..	2	14	9
VEDETTE BOATS—													
3 boats	East Cowes	1892	60	9·3	..	..	..	..	18·3				
Peral..	Carraca ..	1889	70	8·5	..	2	87	60	10				

Sweden.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
First Class—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
3 boats	Stockholm ..	1886	114·4	12·4	6·4	1	60	600	18	1 mach.	2	12	15
Hugin (1)	Chiswick ..	1884	113	12·5	6·2	1	65	620	19·2	1 mach.	2	12	11
Nos. 9 (Gondul), 11 (Gudur)	..	1893	..	..	..	..	..	..	..	2 mach.	2		
1 boat	..	Bldg.	..	..	..	..	90						
9 boats	..	pro.	..	..	..	..	90						
Second Class—													
Agda (77)	Carlskrona..	1891	100·4	11·3	5·8	1	40	450	19	1 mach.	2	12	7·5
Agne (75)	Stockholm ..	1891	100·4	11·3	5·8	1	40	450	19	1 mach.	2	12	7·5
Blink (61)	Stockholm ..	1882	91·5	11·7	5·2	1	34	350	16	..	1	10	8
Blixt (63)..	..	1883	100·4	11·6	5·4	1	40	360	18	..	2	12	7
Bygve (71)	Stockholm ..	1889	103·2	11·6	5·8	1	41	360	18	..	2	12	9
Bylgia (73)	Stockholm ..	1889	103·2	11·6	5·8	1	41	360	18	..	2	12	9
Galdr (65)	Stockholm ..	1885	100·4	11·6	5·4	1	40	425	18·5	..	2	12	7·5
Narf (67)	Stockholm ..	1886	101·2	11·6	5·7	1	40	450	19	..	2	12	7·5
Nörve (69)	Stockholm ..	1886	101·2	11·6	5·7	1	40	450	19	..	2	12	7·5
Rolf	Stockholm ..	1882	91·5	11·7	5·2	1	34	390	17	..	1	10	8
Seid	Chiswick ..	1882	100	12	5	1	40	360	20·7	1 mach.	2	12	8
6 boats	..	pro.	..	..	..	..	65						
Third Class—													
Nos. 141, 143, 145, 147, 149, 151 (6 boats)	Stockholm ..	1879–90	55	10·7	4·1	2	21	80	10	..	2	..	1·5
Glimt (101)	Chiswick ..	1875	58	7·6	3	1	5	60	18	..	2	..	1·5

The three 114·4-ft. boats are named Freka, Gere, and Munin.

Turkey.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
Destroyers—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Berk-Efshan	Kiel	1894	187	21·6	..	2	270	200	25	6 1-pr. revs.	2		
Tajjar	Kiel	1894	..	..	..	..	230	..	25				
First Class—													
Edjder (No. 10) ..	Gaarden ..	1890	152·7	18·9	7·4	2	150	2,200	23	5 3-prs. Q.F.	2		
1 boat	Constantinople	1889	140	16	6·9	2	120	1,800	23	5 1-pr. revs.	2		
*5 boats	Gaarden ..	1889–90	126·7	15·4	8·6	1	85	1,300	22	2 1-pr. revs.	2	21	8
Timsah	London ..	1887	126	15	..	..	..	..	21·7				
†5 boats	Elbing ..	1886–89	120·3	16·2	..	..	85	1,000	21	2 Nords.	2	20	10
4 boats	Constantinople	1886–89	100·3	11·8	5·5	1	42	550	19·5	2 mach.			
Tewfik	Normand ..	1885	100·7	13	5·5	1	42	550	20				
2 boats	La Seyne and Constantinople	1885	100·7	13	5·5	1	42	550	20·3	2 Nords.			
10 boats	Elbing ..	1890 & Bldg.											
‡2 boats	Teddington	1887	124	15	..	..	..	..	22				
§2 boats	Kiel	1892	127	..	..	..	..	..	22				
Submarine—													
Abdul Hamid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8
Abdul Medjid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8

* These are named Nassir, Fatih, Nussret, Schehab, and Tarik.
† These are named Tir-i-Safer, Saiki, Sefi-i-Bahri, Vessile-i-Nussret, and Giljom.
‡ These are named Mahalet and Satvet.
§ These are named Pervim and Seham.
A third destroyer is understood to be building at Elbing.

United States.

Name or Number.	Where Built, or by Whom.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
1 destroyer	..	Pr.											
FIRST CLASS—													
Cushing	Bristol, R.I.	1890	138·9	14·1	5·3	2	116	1,720	22·5	2 3-pr. Q.F.	3	21	
Ericsson	Dubuque, I.	1892	150	15·6	4·9	2	120	1,800	23	4 3-pr. Q.F.	3	21	40
3 boats	Philadelphia	Bldg.	159	16·9	5·0	2	135	2,000	24·5	4 3-pr. Q.F.	3	..	50
12 boats	..	Pr.	..	..	..	..	100 to 150						
SECOND CLASS—													
Stiletto	Bristol, R.I.	1886	88·6	11	3	1	30	350	18·2	..	2	..	5
VEDETTE BOATS—													
2 boats	New York	1895	61·7	9	..	1	14·8	..	18	1 1-pr.	1	..	1
2 boats	Norfolk, Va.	1895	50	9	..	1	12·1	..	17	1 1-pr.	1	..	·75
SUBMARINE—													
1 boat	New York	Bldg.	80	10·6	..	2	150	1,000	8 to 16				

The destroyer for the United States is to be a modification of the British Daring.

In the new United States first-class boats the rudder is to be forward instead of abaft the screws. In lieu of any fixed tubes, they will have three trainable tubes. The officers will be berthed forward, the men aft. The torpedoes, as the broadside ones in the Ericsson, will probably be 18-in. Whiteheads. The boilers are of the Yarrow type.

The Cushing, in 1894, with all her armament on board, and at her normal draft, went by inland waterways from Washington to New York. An inland waterway similarly available for torpedo-boats will presently be open between Massachusetts and Texas. This may be of considerable strategic value.

The Cushing also took part in some experiments as to the visibility of torpedo-boats at night. The vessel, having been painted a grey of what was believed to be a suitable tint, went out of harbour under, and followed by, the beam of a powerful searchlight, but at about 1,000 yards was completely lost sight of, although she received so much light that those on her deck could read by it. In a subsequent experiment it was found that the boat, approaching from an unknown direction, first betrayed herself by sparks from her fires. Until within about 800 yards she could not be heard.

To reach her place of trial, Long Island Sound, from Dubuque, where she was built, the Ericsson had to steam down the Mississippi, across the Gulf of Mexico, and up the Atlantic Coast. The whole distance of 3,600 knots was accomplished without the slightest breakdown or mishap. Her engines, auxiliary engines, boilers (full), and condensers weigh only 52 tons. The cylinders of the two quadruple expansion vertical engines are of 11·4, 16·1, 21·6 and 29·9 inches in diameter. The boilers are of the Thornycroft type. Had a speed of 24 knots been exceeded, the builders would have received 20,000 per knot in excess. The ejectors are of two kinds. A fixed one in the bow is for Howell, and two training ones aft are for Whitehead torpedoes.

The 61·7 ft. boats, designed for the Maine, have each a fixed 18-in. tube in the bow, for 18-in. Whiteheads. The 50 ft. boats, designed for the Texas, have each a training 18 in. tube on deck. The larger boats weigh about 6 tons 3 cwt., and the smaller ones about 5 tons.

The latest pattern of Howell torpedo is of 18 in. calibre, carries a 220 lb. charge, and has a speed of 32 knots up to a range of 600 yards.

The Cunningham torpedo has been run experimentally in the United States, and is said to have shown promise but to need improvement.

The submarine boat building for the United States' Government by a specially organised company at New York is after plans by Mr. John P. Holland. The contract specifies that she shall be ready for her trials before the end of 1895. The boat will normally travel on the surface like an ordinary torpedo-boat, and will then be driven by steam, or alternatively by dynamos fed from accumulators. When submerged, she will be driven by the dynamos. The shape is that of a double-pointed cigar: and the I.H.P. is estimated to give a surface speed of 16 knots. The dynamos and accumulators are designed to give an under-water speed of 8 knots. Submersion to a depth of 70 feet is provided for; and the accumulators will furnish motive power for 16 hours. Submersion is effected by the introduction of water. The funnel is telescopic, and can be completely drawn into the vessel. There is an automatic horizontal rudder to control the depth after a certain limit of submersion has been reached. The air is renewed, either by means of a cowl, when the vessel is nearly awash, or from compressed supplies, when she is at great depths.

WM. LAIRD CLOWES.

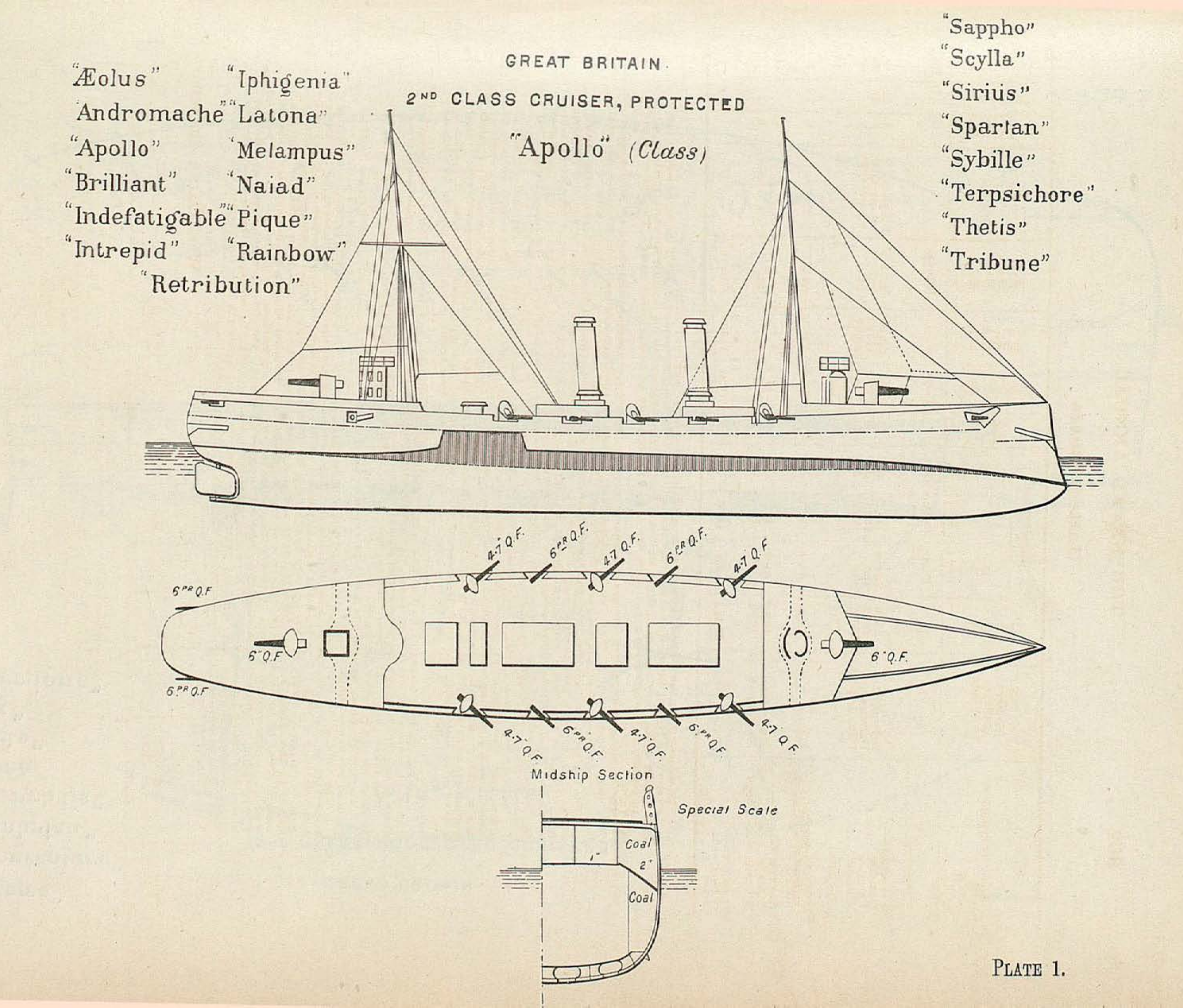

GREAT BRITAIN.
2ND CLASS CRUISER, PROTECTED
"Apollo" (Class)
"Æolus" "Iphigenia"
"Andromache" "Latona"
"Apollo" "Melampus"
"Brilliant" "Naiad"
"Indefatigable" "Pique"
"Intrepid" "Rainbow"
"Retribution"
"Sappho"
"Scylla"
"Sirius"
"Spartan"
"Sybille"
"Terpsichore"
"Thetis"
"Tribune"
6PR Q.F
6" Q.F
6PR Q.F
4·7 Q.F.
6PR Q.F.
4·7 Q.F.
6PR Q.F.
4·7 Q.F
6" Q.F.
4·7 Q.F
6PR Q.F
4·7 Q.F
6PR Q.F
4·7 Q.F
Midship Section
Special Scale
Coal
1"
2"
Coal

PLATE 1.

"Astræa"
"Bonaventure"
"Cambrian"
"Charybdis"
"Flora"
"Forte"
"Fox"
"Hermione"

GREAT BRITAIN

2ND CLASS PROTECTED CRUISERS

"Astræa" (Class)

On Special Scale
Midship Section

Coals
1"
2"
Coals

4·7in. Q.F
6pr Q.F
4·7in. Q.F
6pr Q.F
4·7in. Q.F.
6pr Q.F.
4·7in. Q.F
6in.
Q.F
6in.
Q.F

PLATE 2.

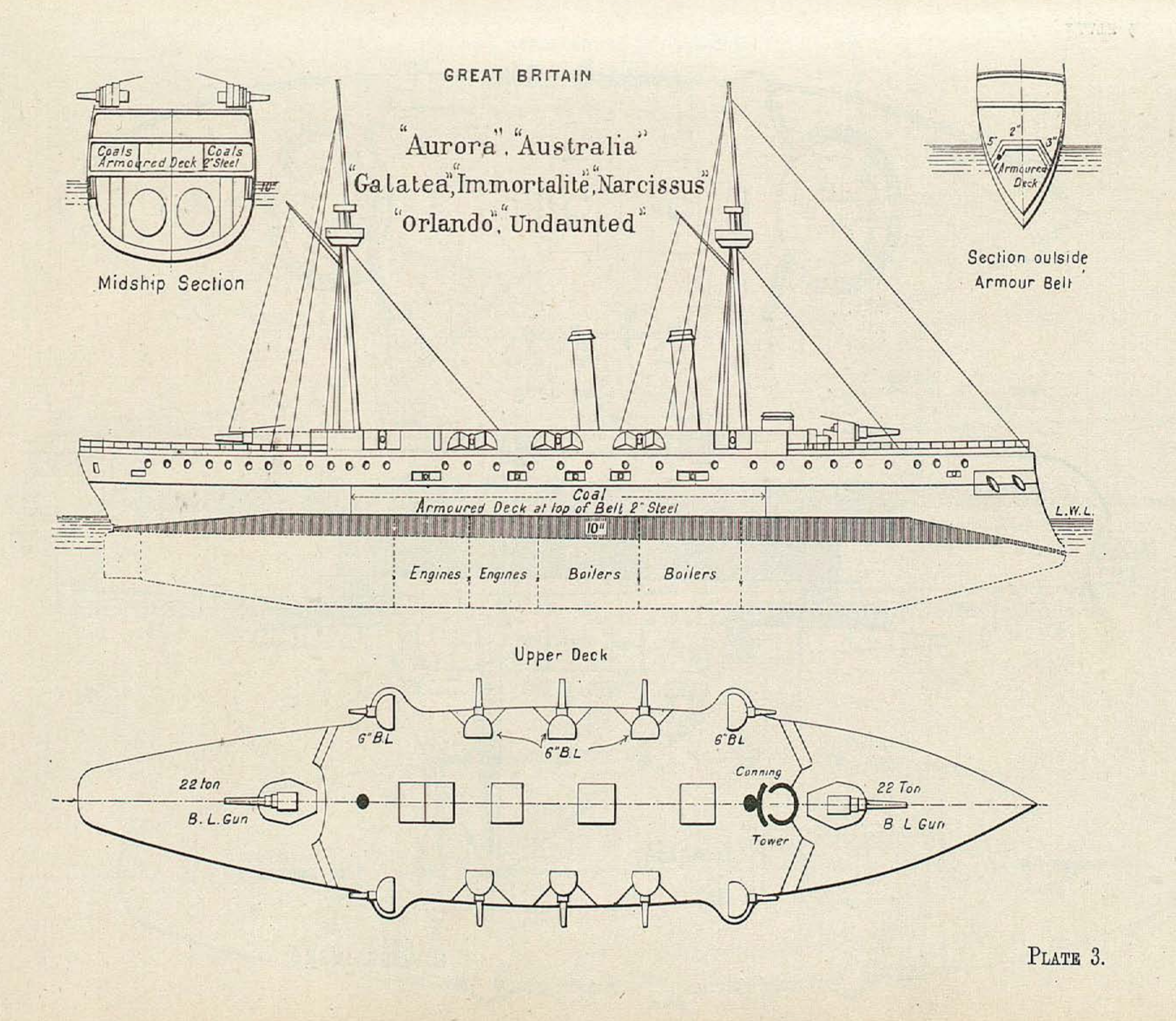

GREAT BRITAIN
"Aurora", "Australia"
"Galatea", "Immortalité", "Narcissus"
"Orlando", "Undaunted"
Coals
Armoured Deck
Coals
2" Steel
10"
Midship Section
2"
5"
3"
Armoured Deck
Section outside Armour Belt
Coal
Armoured Deck at top of Belt 2" Steel
10"
L.W.L.
Engines
Engines
Boilers
Boilers
Upper Deck
6" B.L
6" B.L
6" B.L
22 ton
B. L. Gun
Conning
Tower
22 Ton
B L Gun

Plate 3.

GREAT BRITAIN

"Benbow"

14"

18"

14"

L.W.L.

Spar Deck

6in. 6in 6in. 6in 6in.

111 ton B.L

111 ton B.L.

PLATE 4.

GREAT BRITAIN

1ST CLASS PROTECTED CRUISERS

"Blake" & "Blenheim"

CREAT BRITAIN

FIRST CLASS BATTLE SHIPS

"Centurion" & "Barfleur"

12"

12"

4"

12"

L.W.L.

4·7" Q.F.

4·7" Q.F.

4·7" Q.F

4·7" Q.F

4·7" Q.F.

29 ton B.L.

29 ton B.L

PLATE 6

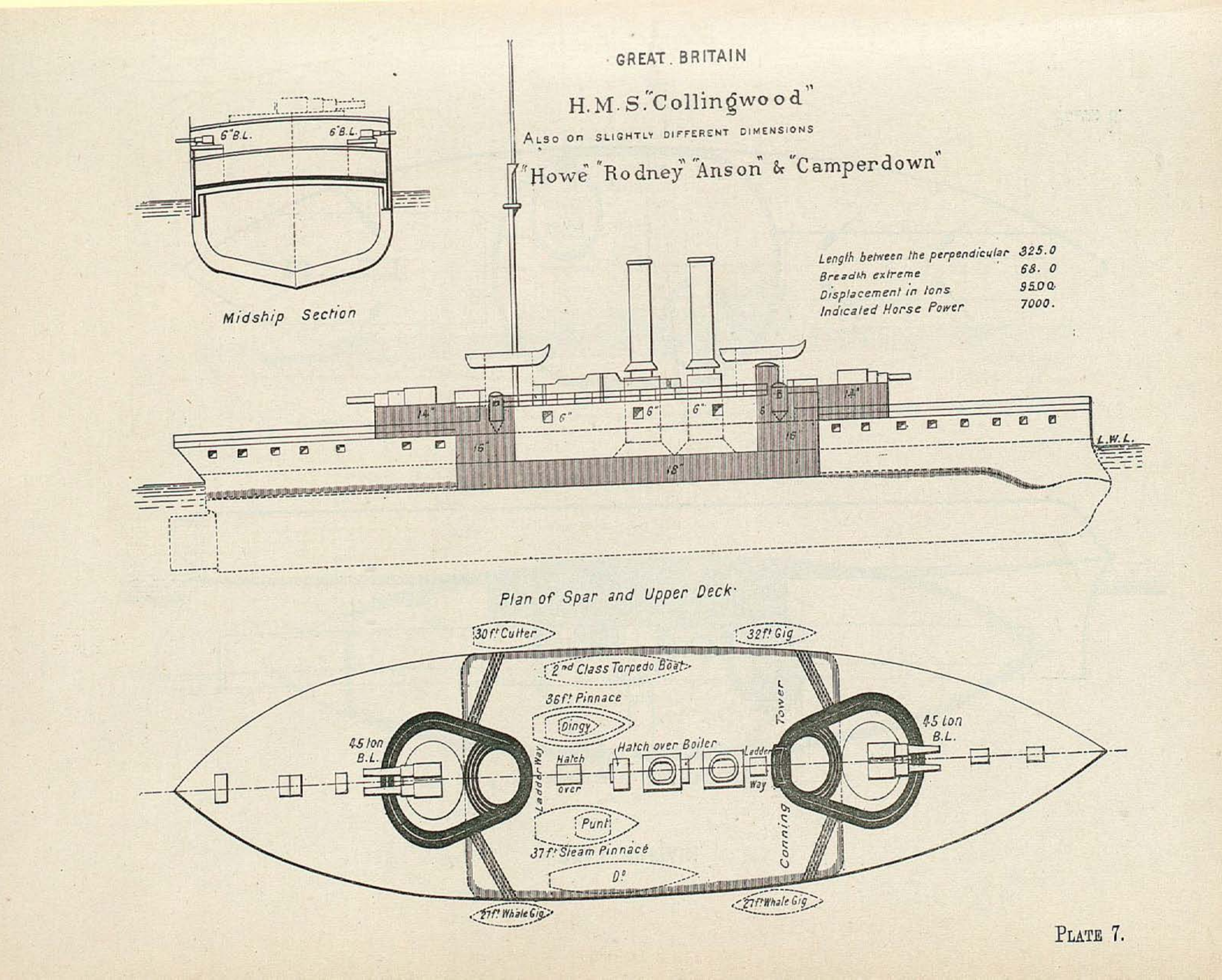

GREAT. BRITAIN
H.M.S. "Collingwood"
Also on slightly different dimensions
"Howe" "Rodney" "Anson" & "Camperdown"
6" B.L.
6" B.L.
Midship Section
Length between the perpendicular 325.0
Breadth extreme 68. 0
Displacement in tons 9500.
Indicated Horse Power 7000.
14"
15"
6"
6"
6"
18"
16"
14"
L.W.L.
Plan of Spar and Upper Deck
30 ft Cutter
32 ft Gig
2nd Class Torpedo Boat
36 ft Pinnace
Dingy
45 ton B.L.
Hatch over
Ladder Way
Hatch over Boiler
Ladder Way
Conning Tower
45 ton B.L.
Punt
37 ft Steam Pinnace
D°
27 ft Whale Gig
27 ft Whale Gig

Plate 7.

GREAT BRITAIN

"Colossus" & "Edinburgh"

18"–14"

18"–14"

18"–14"

6" B.L.

45 ton B.L.

45 ton B.L.

6" B.L.

6" B.L.

PLATE 8.

GREAT BRITAIN

"Conqueror" & "Hero"

12"

12" – 8½"

Upper Deck

6" B.L.

6" B.L.

0½"

45 ton

B.L.

PLATE 9.

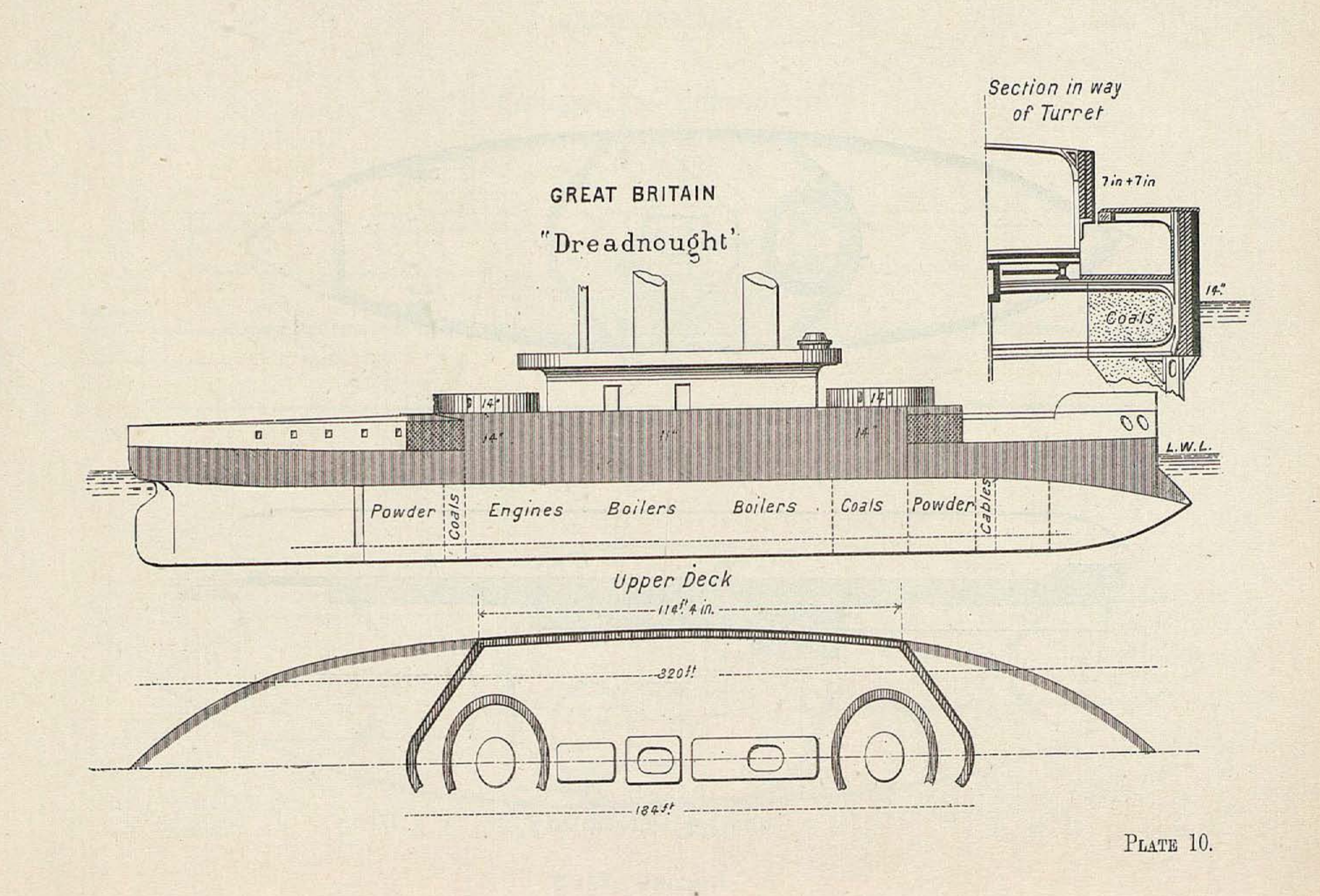

GREAT BRITAIN
"Dreadnought"
Section in way of Turret
7 in + 7 in
14"
Coals
14"
14"
11"
L.W.L.
Powder
Coals
Engines
Boilers
Boilers
Coals
Powder
Cables
Upper Deck
114 ft. 4 in.
320 ft
184 ft

PLATE 10.

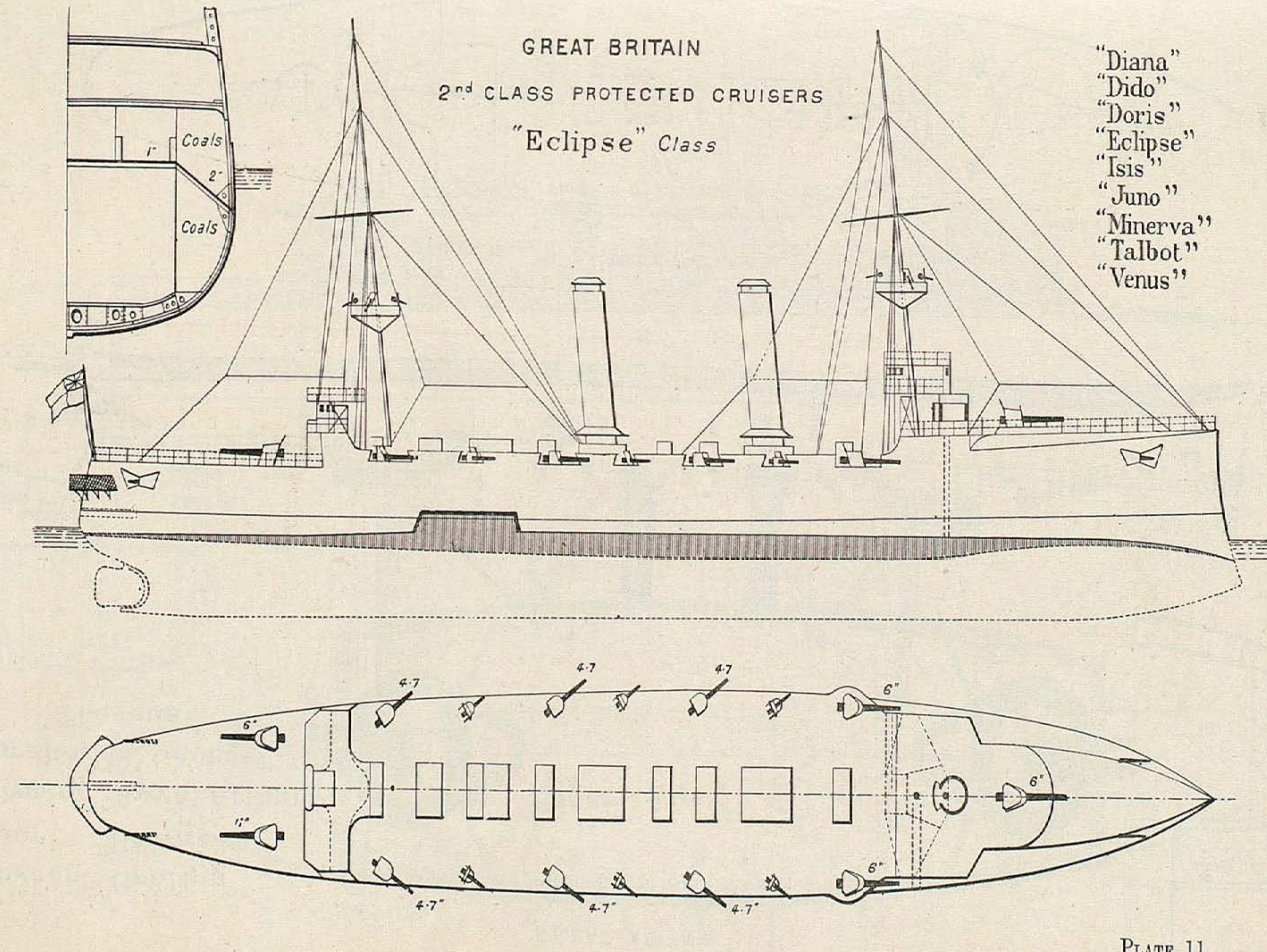

GREAT BRITAIN
2nd CLASS PROTECTED CRUISERS
"Eclipse" Class
"Diana"
"Dido"
"Doris"
"Eclipse"
"Isis"
"Juno"
"Minerva"
"Talbot"
"Venus"
Coals
1"
2"
Coals
4·7
4·7
4·7
6"
6"
6"
6"
4·7"
4·7"
4·7"

PLATE 11.

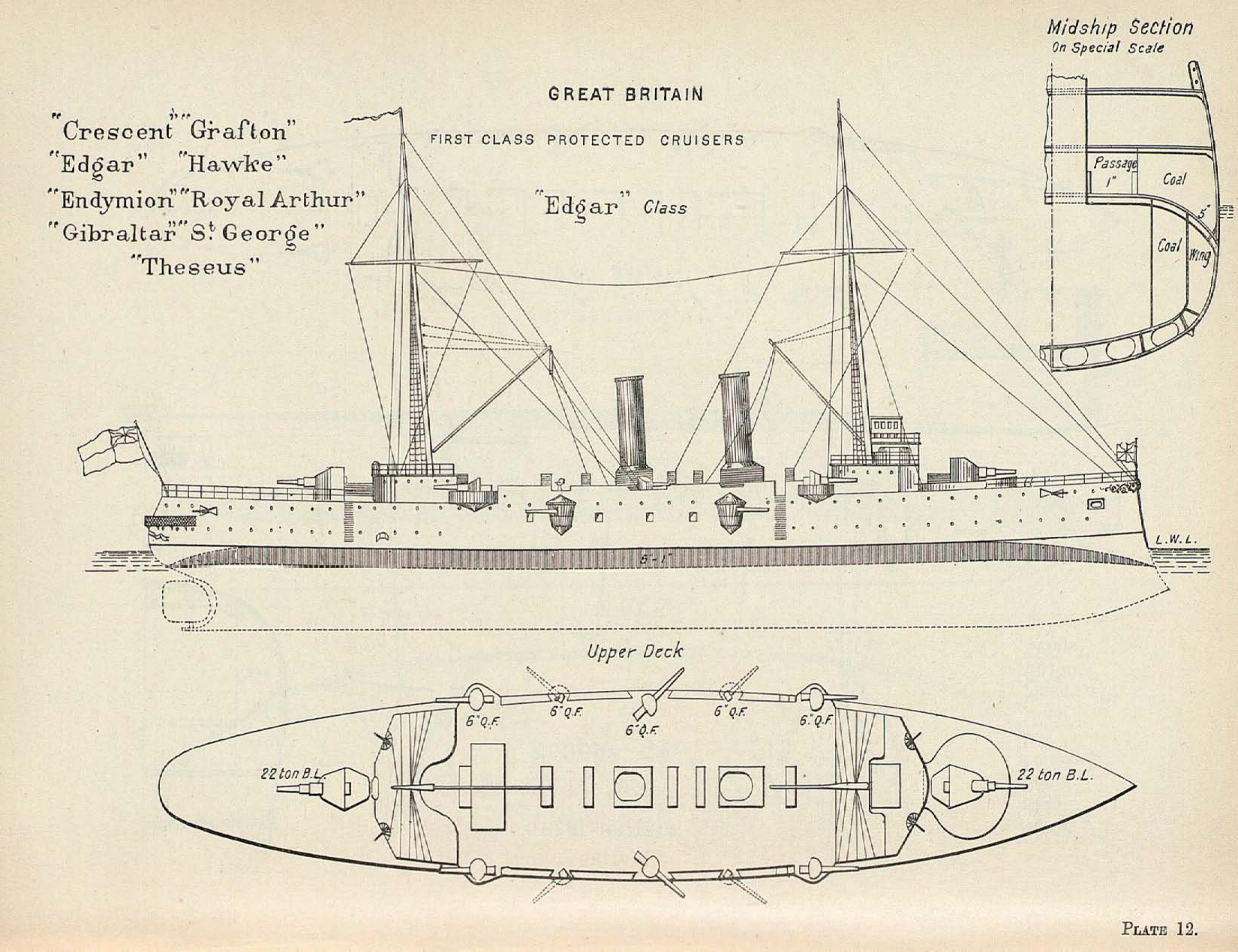
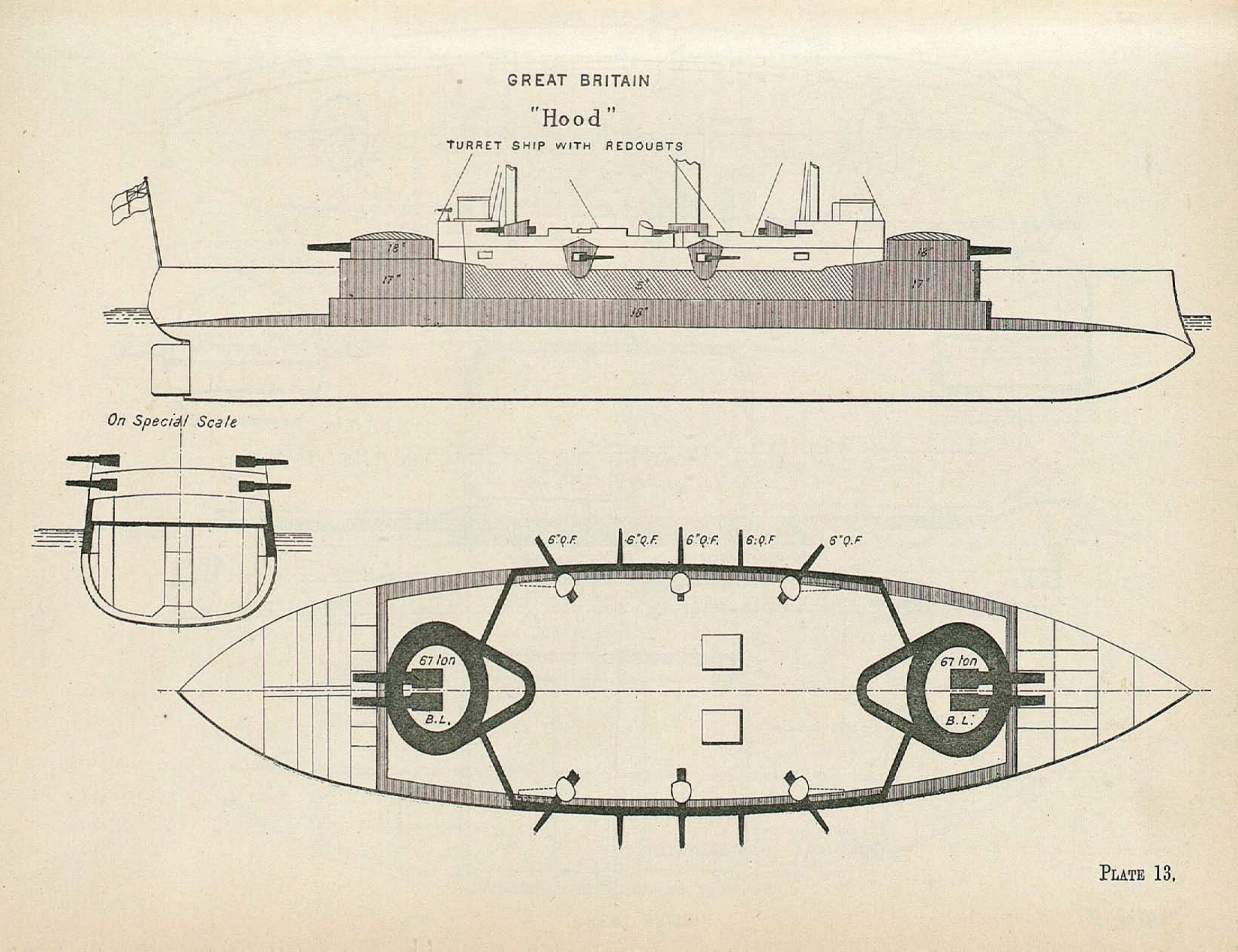

GREAT BRITAIN
FIRST CLASS PROTECTED CRUISERS
"Edgar" Class
"Crescent" "Grafton"
"Edgar" "Hawke"
"Endymion" "Royal Arthur"
"Gibraltar" "St George"
"Theseus"
Midship Section
On Special Scale
Passage
1"
Coal
5"
Coal
Wing
L.W.L.
6-1"
Upper Deck
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
22 ton B.L.
22 ton B.L.

PLATE 12.


GREAT BRITAIN
"Hood"
TURRET SHIP WITH REDOUBTS
18"
17"
5"
16"
18"
17"
On Special Scale
6" Q.F.
6" Q.F.
6" Q.F.
6: Q.F
6" Q.F
67 ton
B.L.
67 ton
B.L.
PLATE 13.

GREAT BRITAIN

"Imperieuse" "Warspite"

PLATE 14.

"Inflexible"

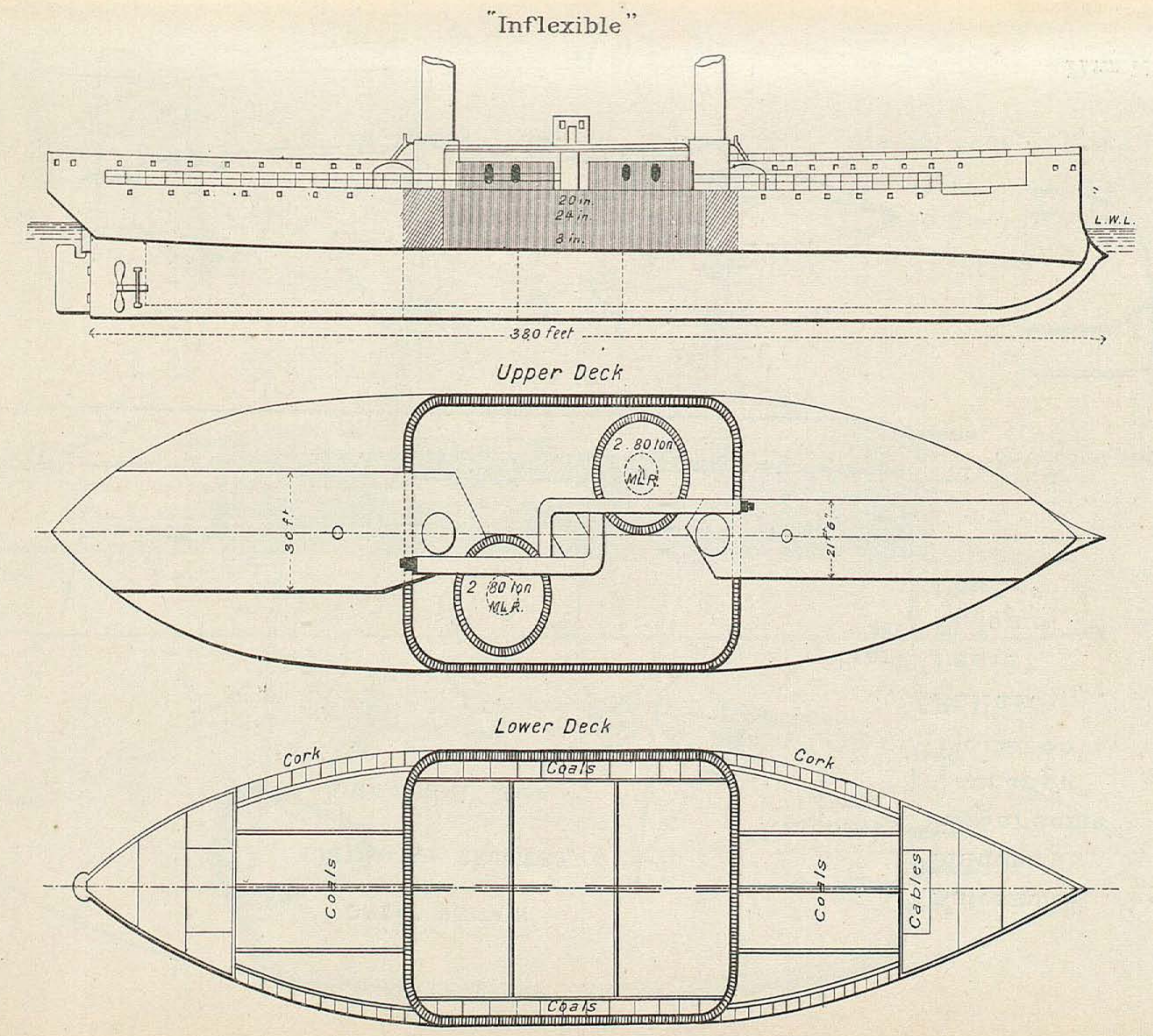
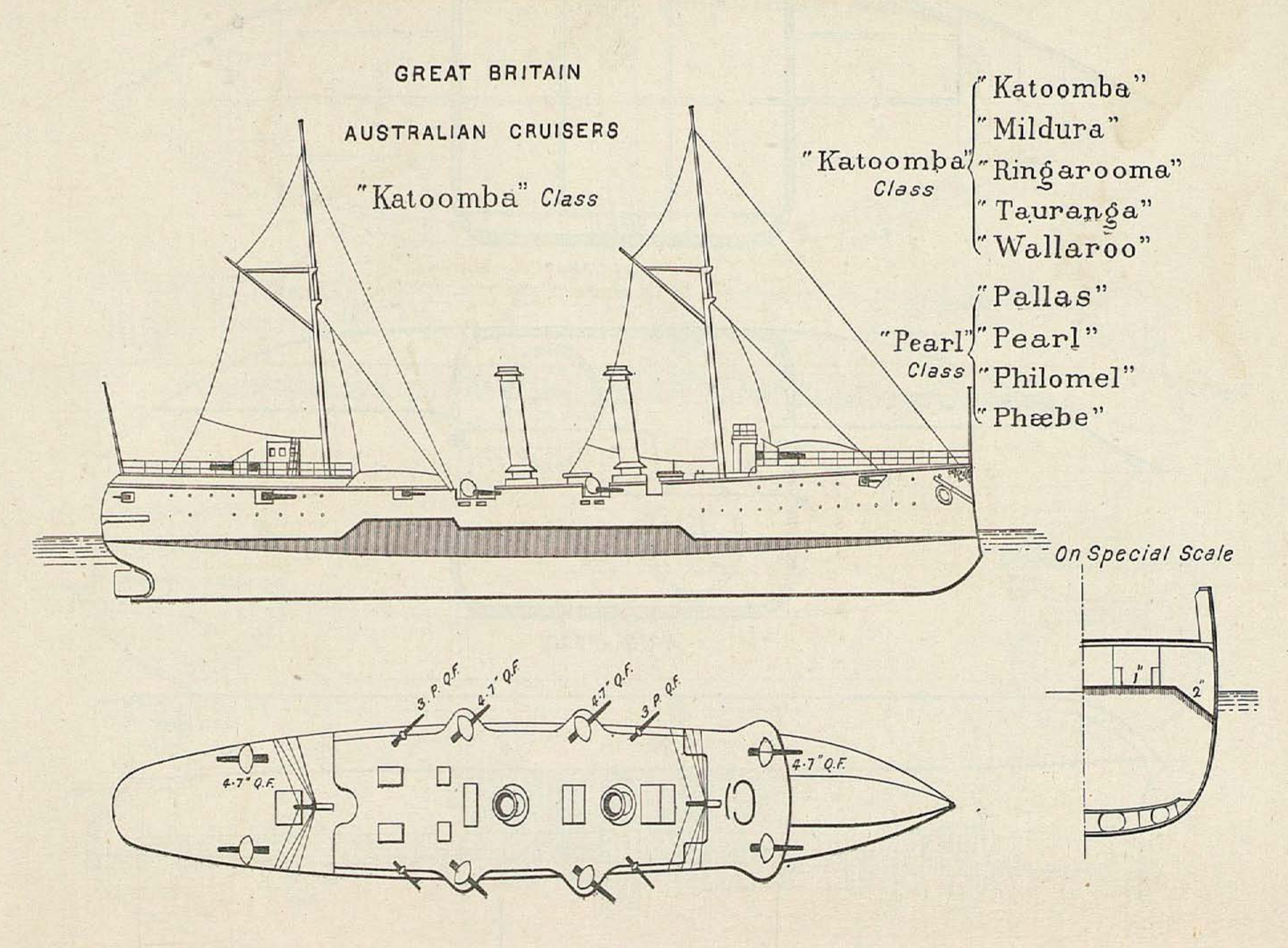


PLATE 15.



GREAT BRITAIN
AUSTRALIAN CRUISERS
"Katoomba" Class
"Katoomba" Class
"Katoomba"
"Mildura"
"Ringarooma"
"Tauranga"
"Wallaroo"
"Pearl" Class
"Pallas"
"Pearl"
"Philomel"
"Phæbe"
On Special Scale
1"
2"
3. P. Q.F.
4·7" Q.F.
4·7" Q.F.
3. P. Q.F.
4·7" Q.F.
4·7" Q.F.

PLATE 16.

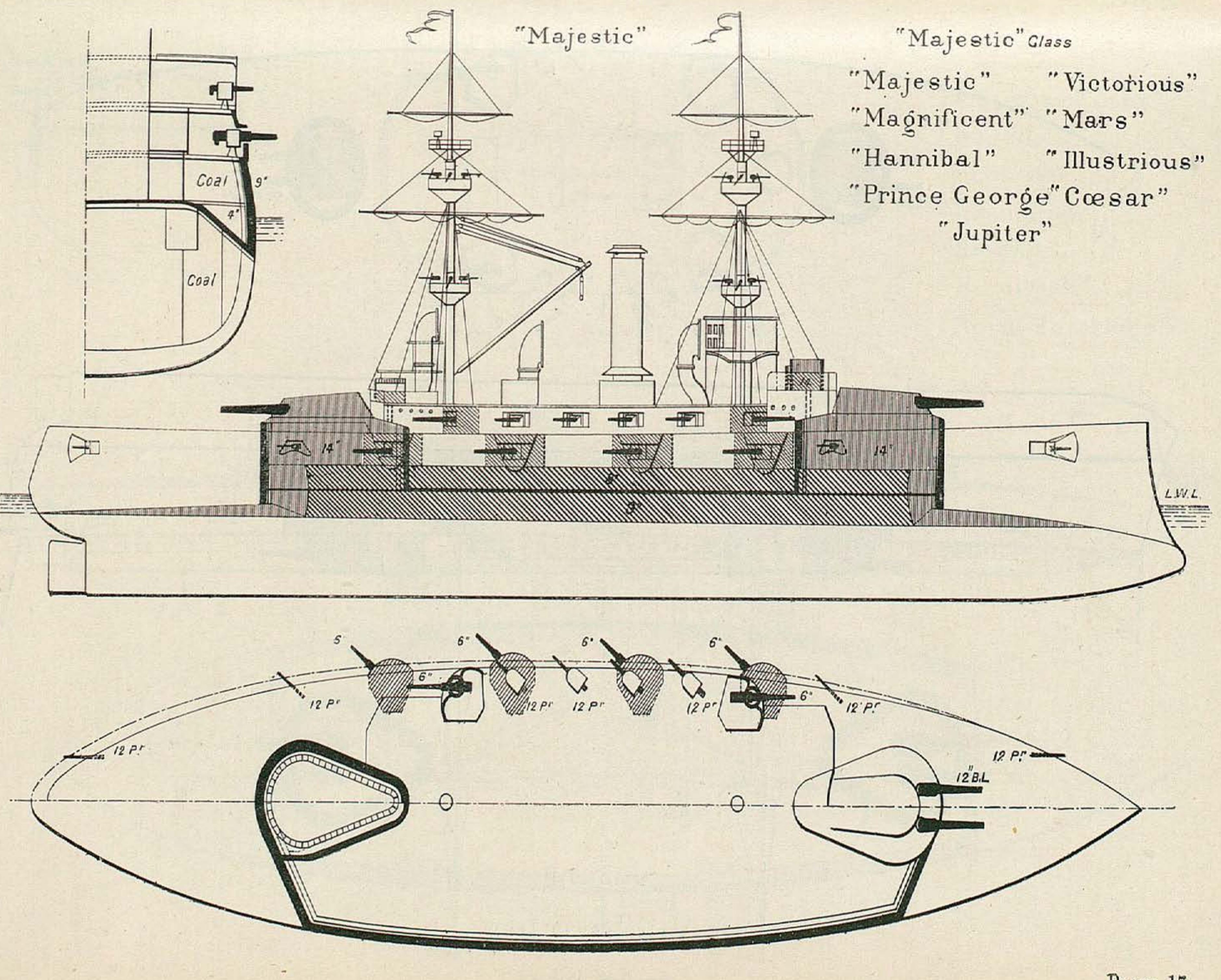

"Majestic"
"Majestic" Class
"Majestic" "Victorious"
"Magnificent" "Mars"
"Hannibal" "Illustrious"
"Prince George" "Cœsar"
"Jupiter"
Coal
9"
4"
Coal
14"
14"
8"
9"
L.W.L.
5"
6"
6"
6"
6"
6"
12 Pr
12 Pr
12 Pr
12 Pr
12 Pr
12 Pr
12 Pr
12" B.L.

Plate 17.

GREAT BRITAIN

FIRST CLASS BATTLESHIP

"Renown"

Plate 18.

GREAT BRITAIN

"Royal Sovereign"

of 14,150 tons displacement
& 13,000, I.H. Power

"Royal Sovereign" Class

"Empress of India"
"Ramillies"
"Repulse"
"Resolution"
"Revenge"
"Royal Oak"
"Royal Sovereign"

On Special Scale

17"
5"
18"
17"
L.W.L.

6" Q.F.
6" Q.F
6 in Q F
6" Q.F.
6" Q.F.
67 ton
67 ton

PLATE 19.

"Sans Pareil"

18"
6"
18"
18–16
L.W.L
6 in
6 in
6in
6 in
6 in
150'
16 in
111 ton
29 ton
150'
Span Deck
Upper Deck
Coals
Machinery Space
Midship Section
Upper Deck
Crew Space
Main Deck
Coals
Armour Deck 3"
Coals
W.T. Compt
Section before Turret

"Trafalgar"

"Nile"

18"
18"-14"
20"-16"
18"
18"-14"
L. W. L.
Cast Steel Ram filled in with teak
Armoured Belt on Water Line 20"
230' · 0"
A. B Lower Citidel
C.D. Upper Citidel
345' 0"
193' 0"
4·7 in QF 4·7 in QF 4·7 in QF 4·7 in QF
A
B
Armour
Armoured
5" Armour
Armour 18"
Armoured
Armoured
Armoured
14" Armour
Armoured Bulkhead
C
67 ton
Central Box Battery
110' 0"
Armoured Spar Deck
5" Armour
67 ton
16" Armour
Steel Deck 3" thick
16"
Deck
Deck

PLATE 21.

ARGENTINA.

"Almirante Brown."

B"
9"
L.W.L.

Plate 22.

ARGENTINA.

"Libertad" & "Independencia".

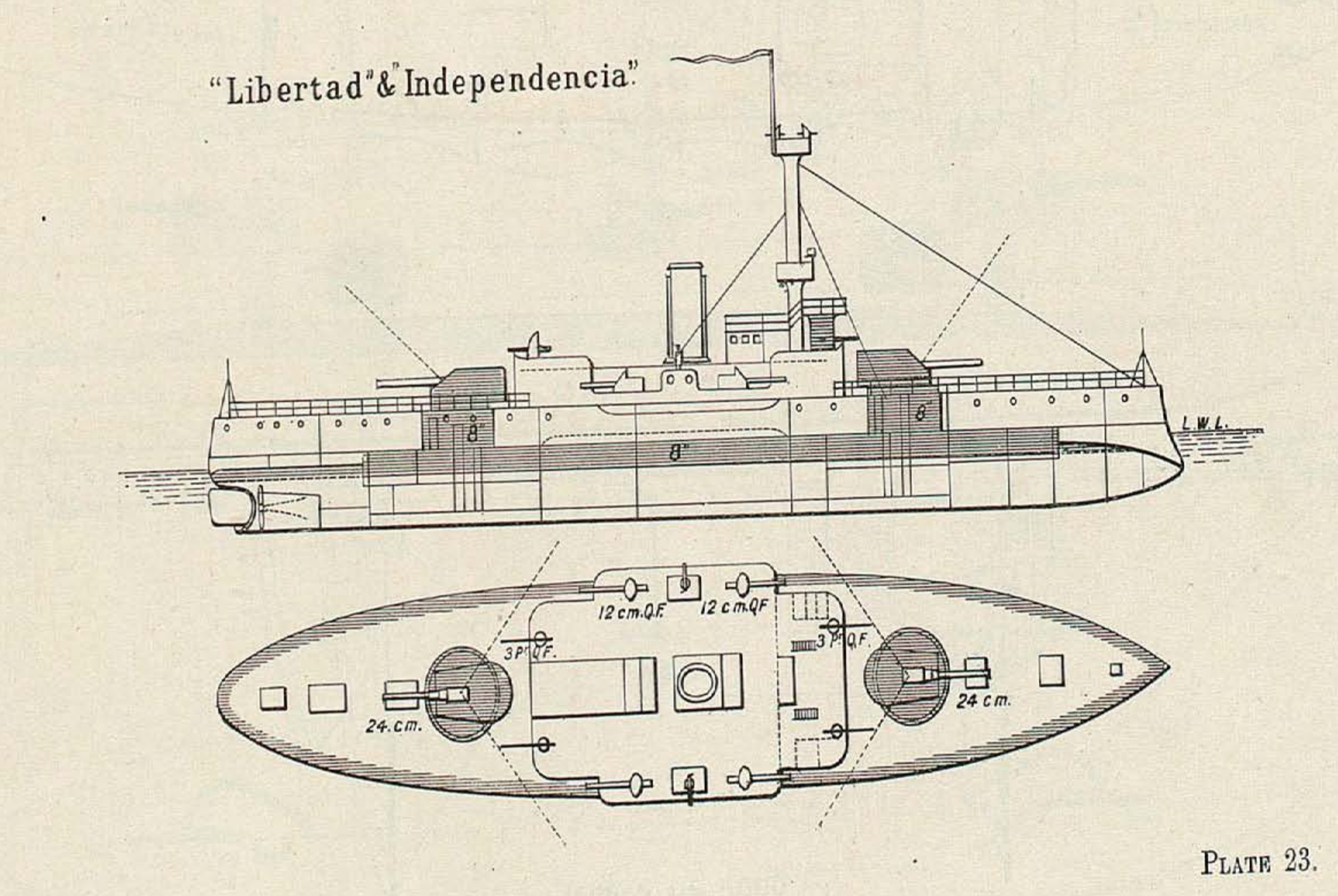


PLATE 23.

ARGENTINA.

"Nueve de Julio."

L.W.L.

6 in Q.F.

6 in Q.F

4·7 in Q.F.

4·7 in Q.F.

4·7 in Q.F.

6 in Q.F

6 in Q.F.

6 in Q.F

PLATE 24.

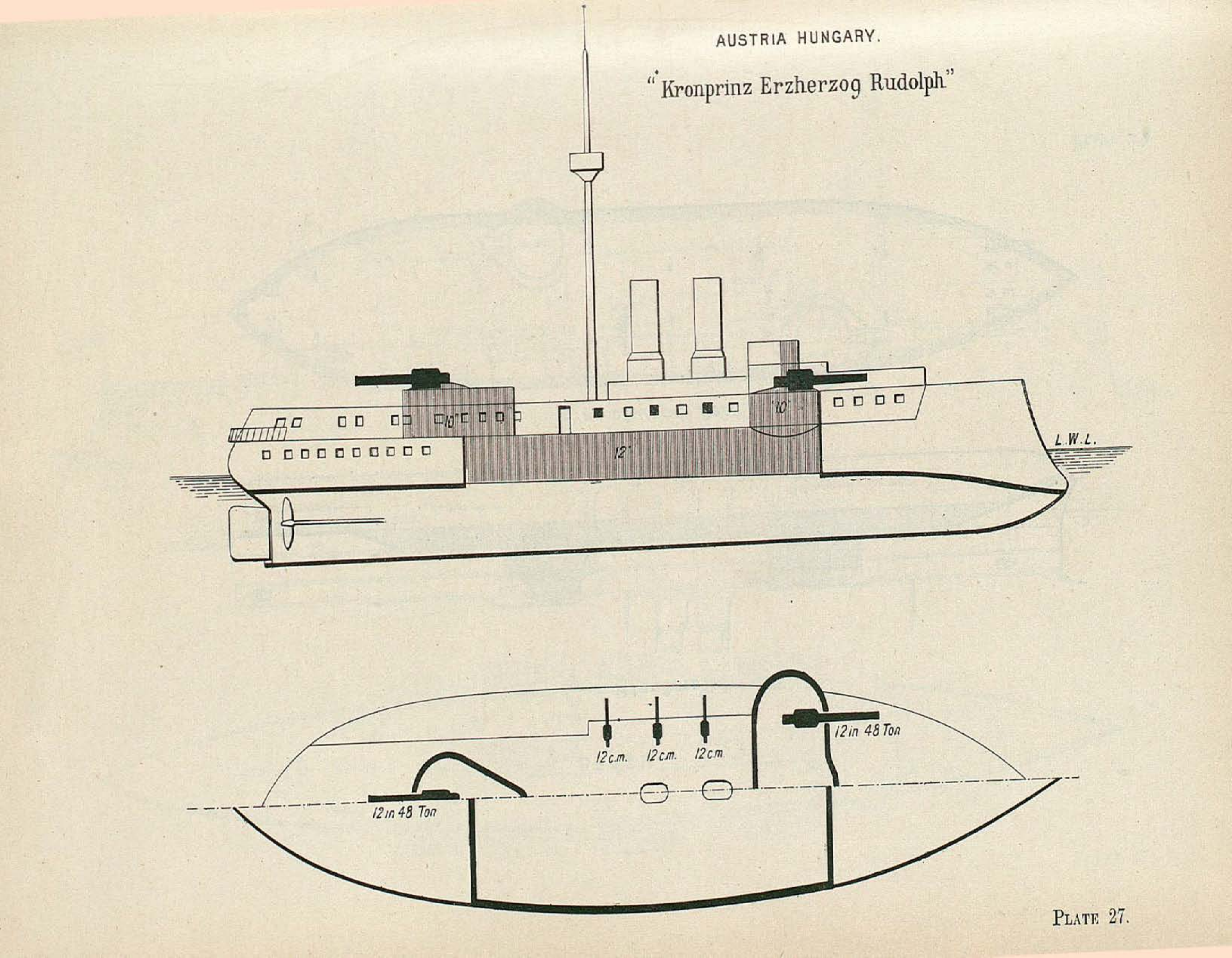
AUSTRIA HUNGARY.

"Kaiser Franz Joseph."

PLATE 25.

AUSTRIA-HUNGARY.

"Kronprincessin Erzherzogin Stefanie."


AUSTRIA HUNGARY.
"Kronprinz Erzherzog Rudolph"
10"
10"
12"
L.W.L.
12 c.m.
12 c.m.
12 c.m.
12 in 48 Ton
12 in 48 Ton
PLATE 27.

BRAZIL.

"Riachuelo"

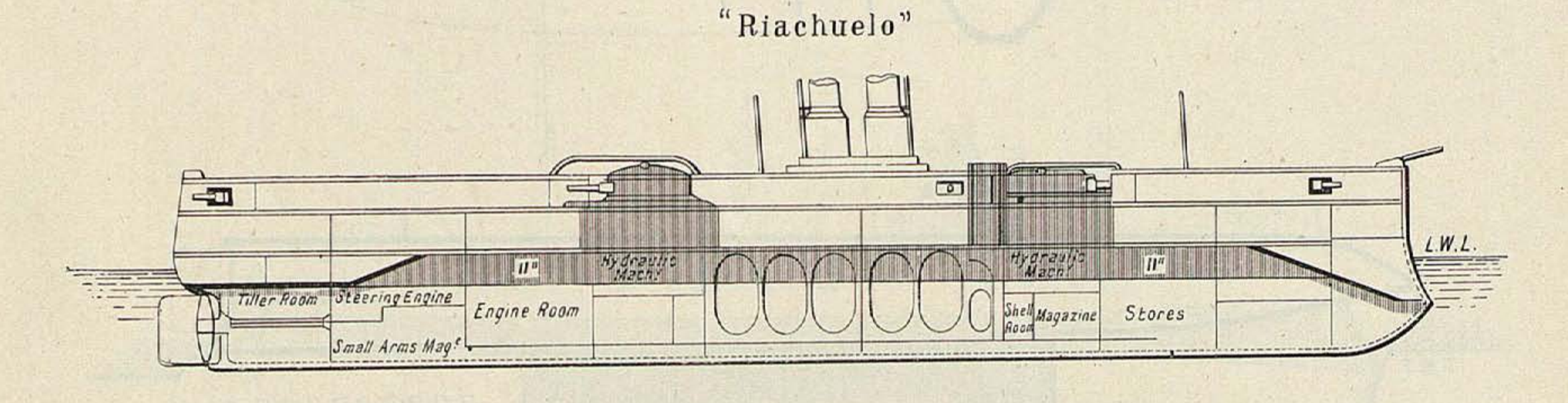


Plate 28.

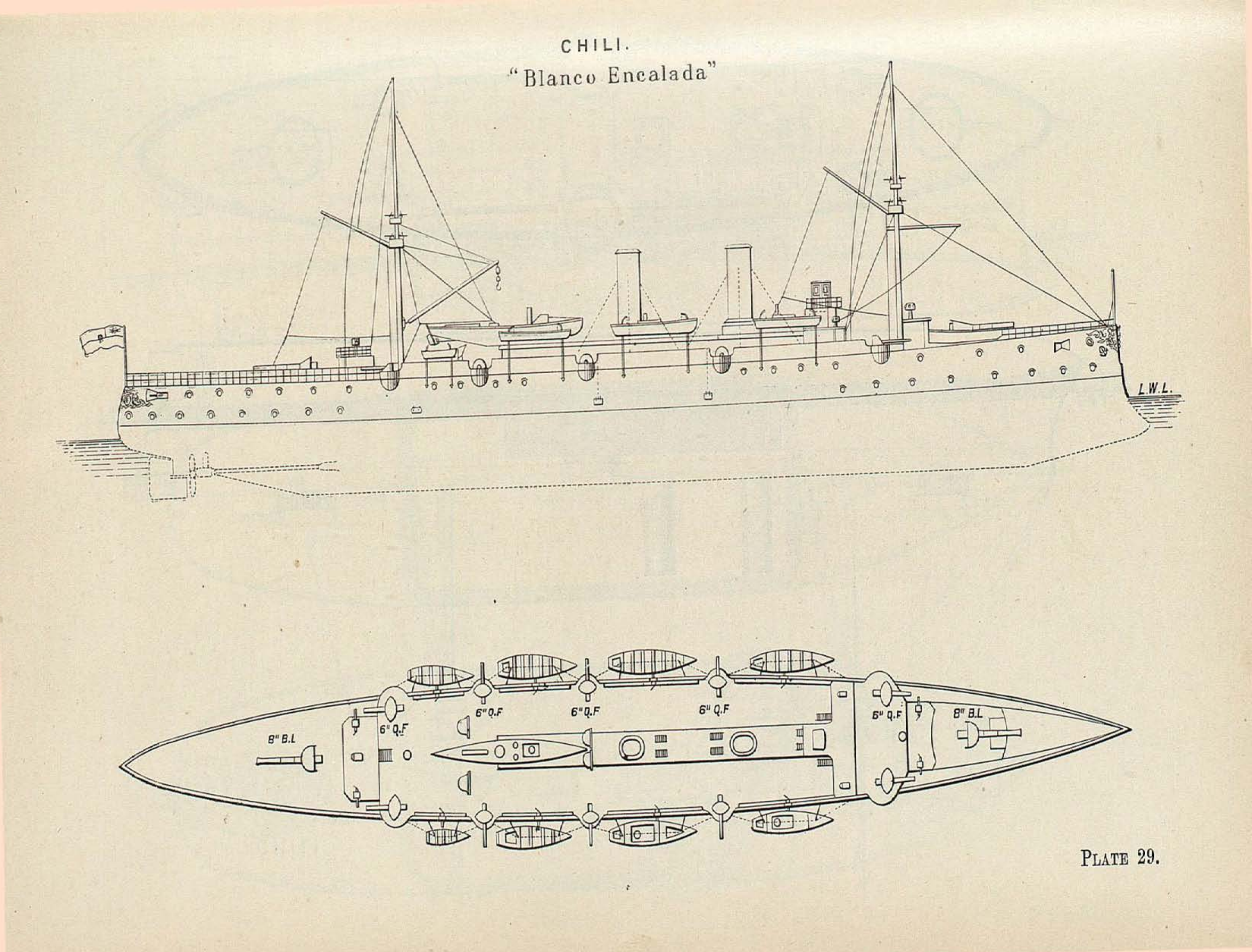


PLATE 29.

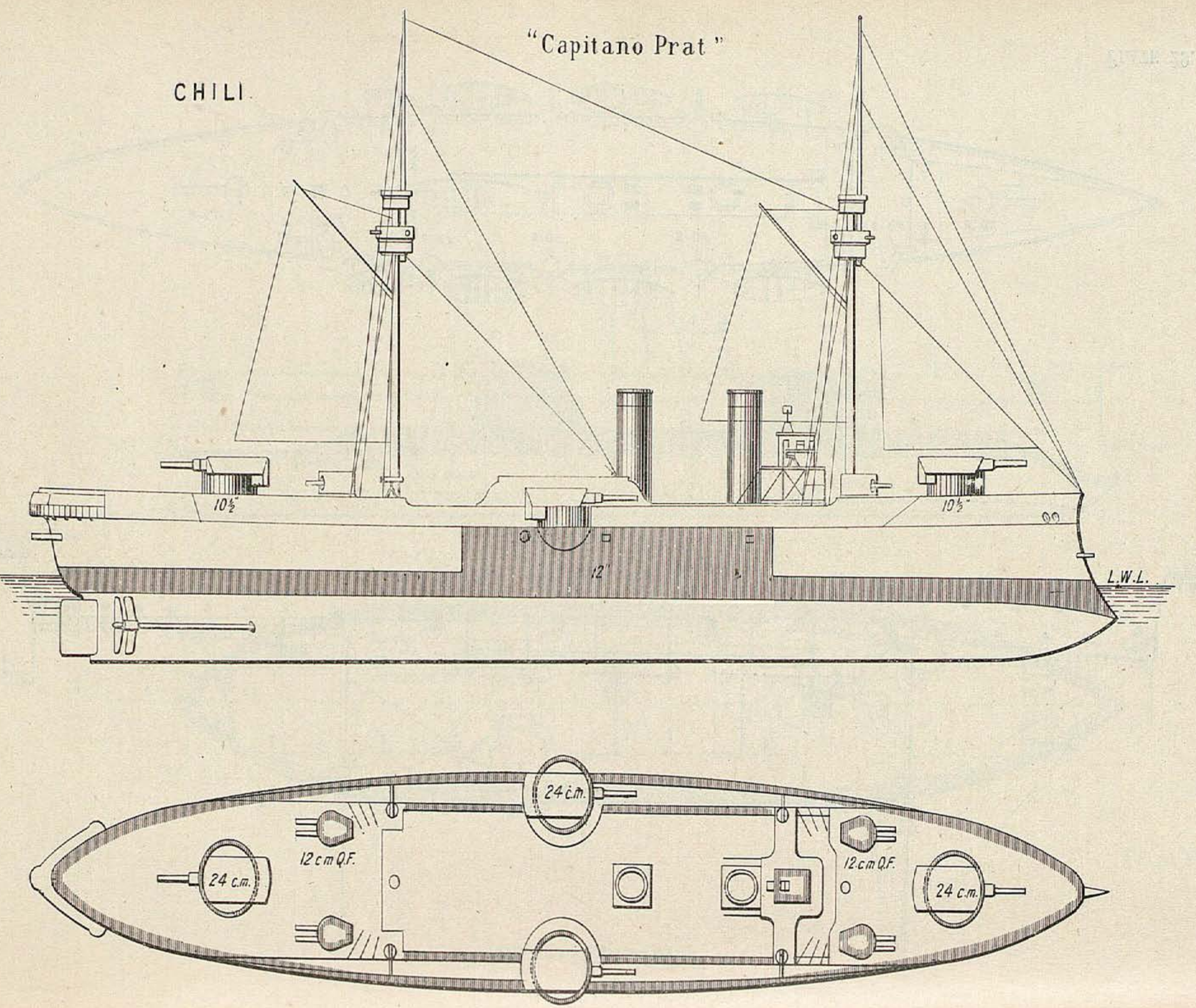

CHILI
"Capitano Prat"
10½"
10½"
12"
L.W.L.
24 c.m.
12 c m Q.F.
24 c.m.
12 c m Q.F.
24 c.m.

Plate 30.

CHINA.

"Ting Yuen" & "Chen Yuen"

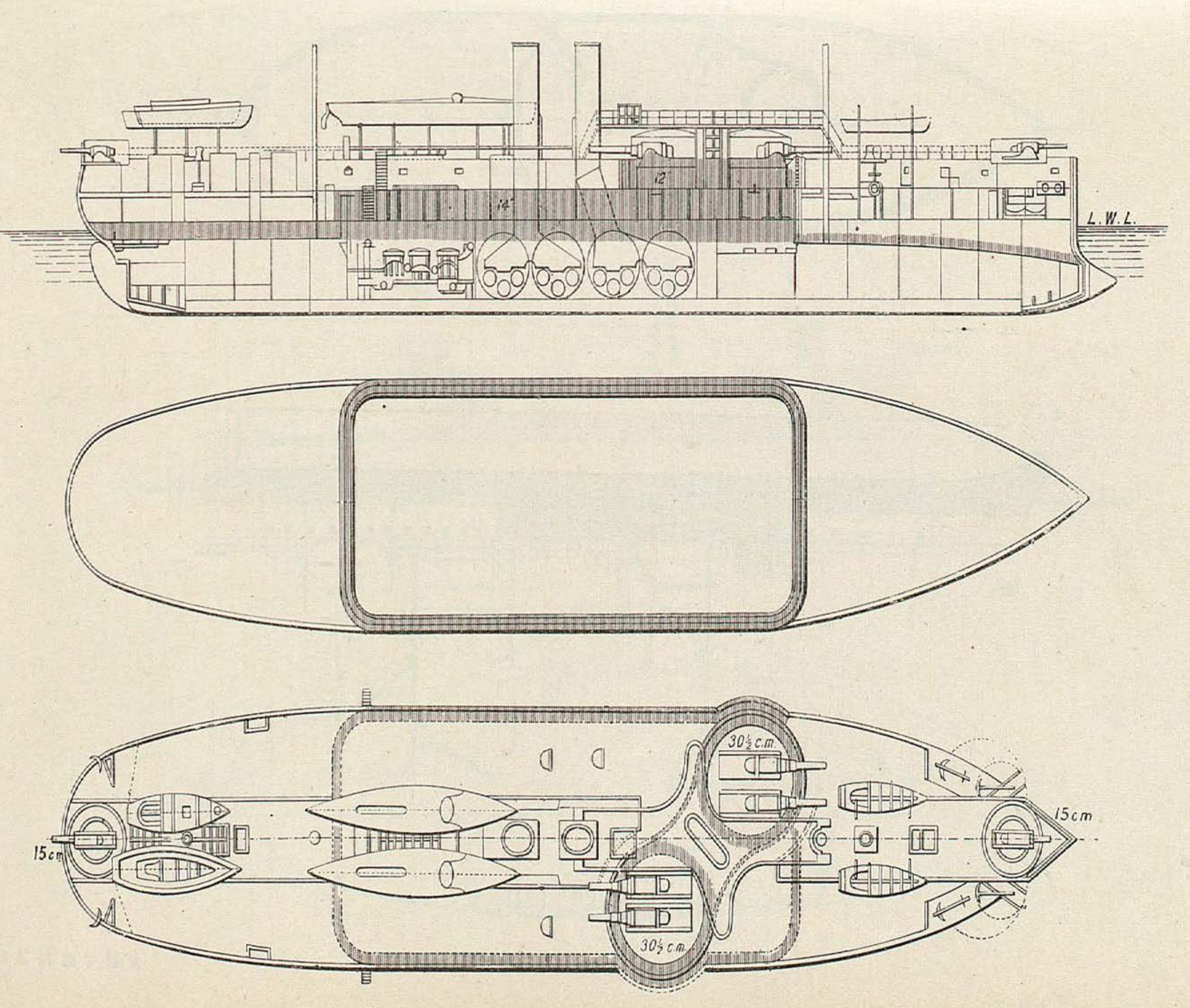
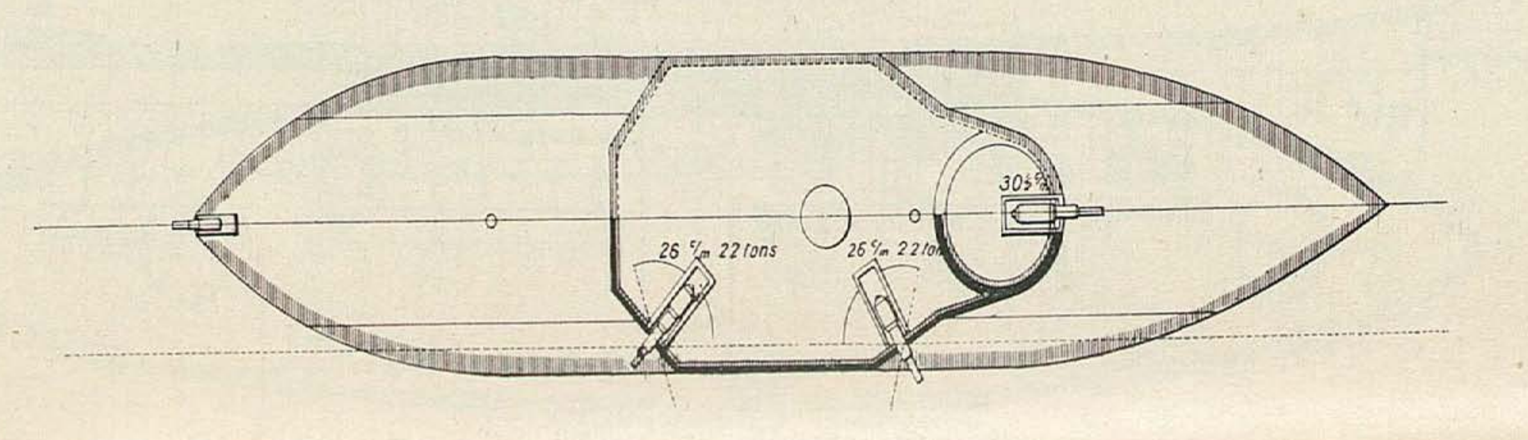


PLATE 31.

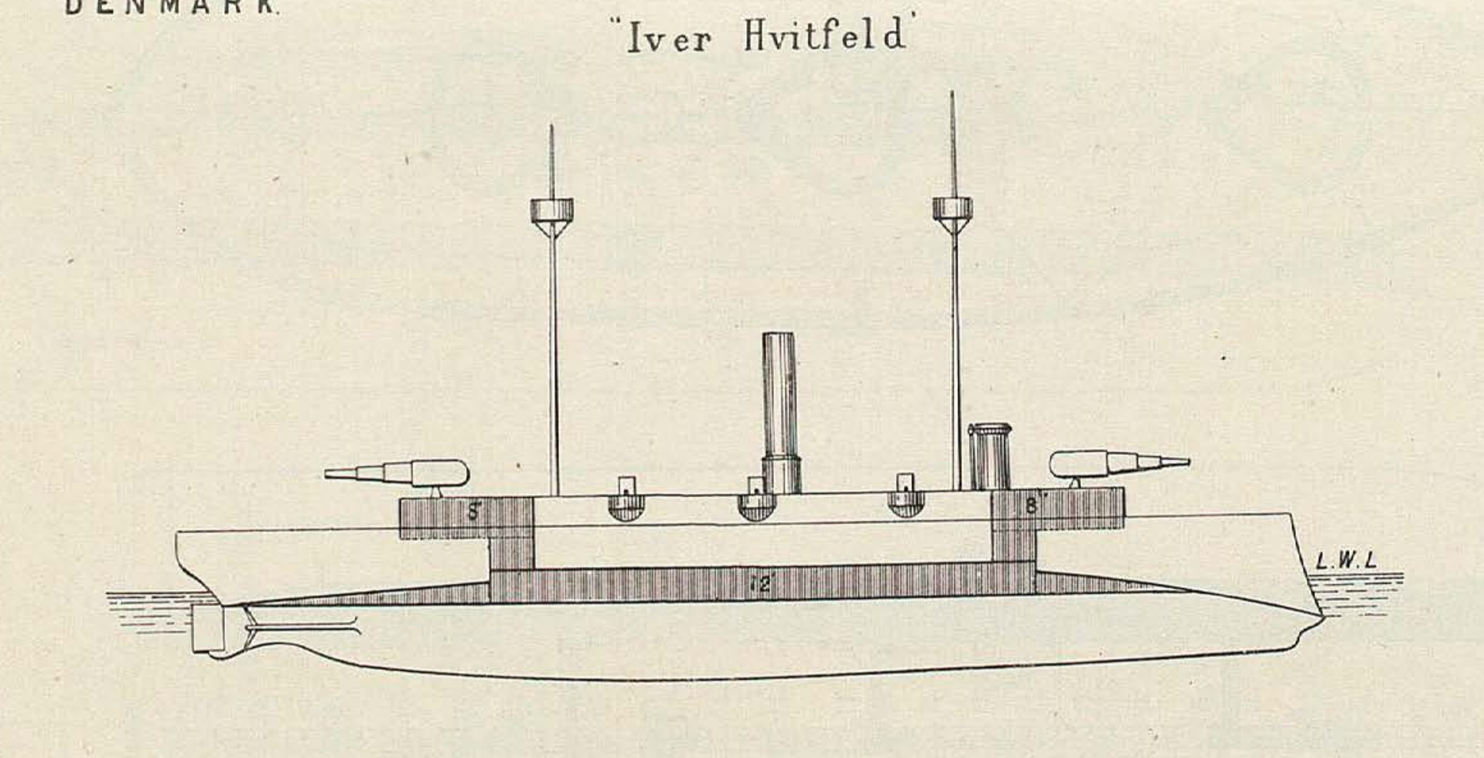
DENMARK.

"Helgoland"



DENMARK.

"Iver Hvitfeld"



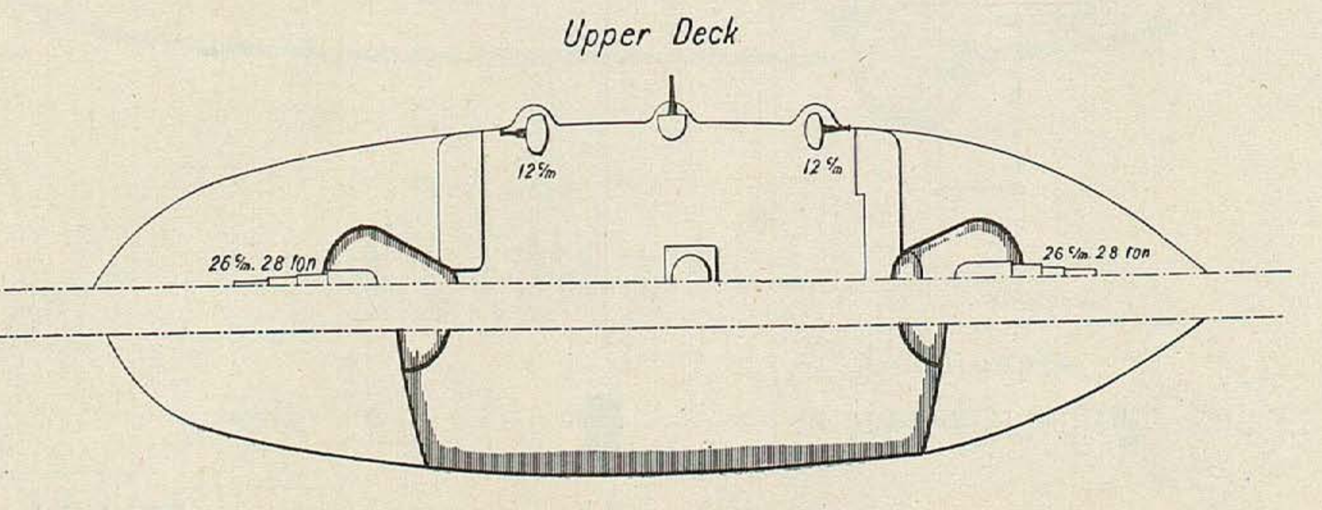


PLATE 33.

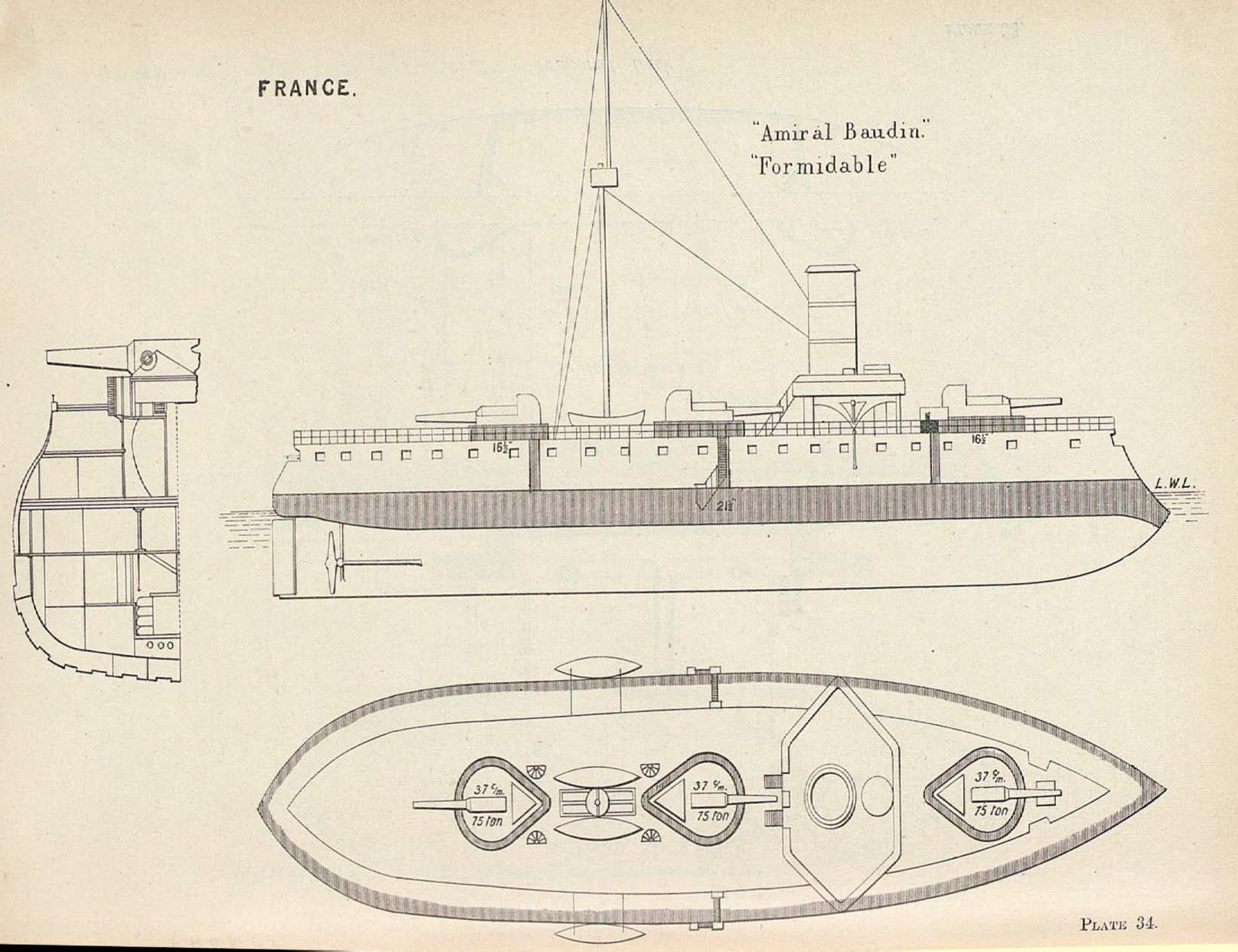

FRANCE.
"Amiral Baudin."
"Formidable"
16½"
16½"
21½"
L.W.L.
37 c/m.
75 ton
37 c/m.
75 ton
37 c/m.
75 ton

Plate 34.

FRANCE. "Amiral Duperré"

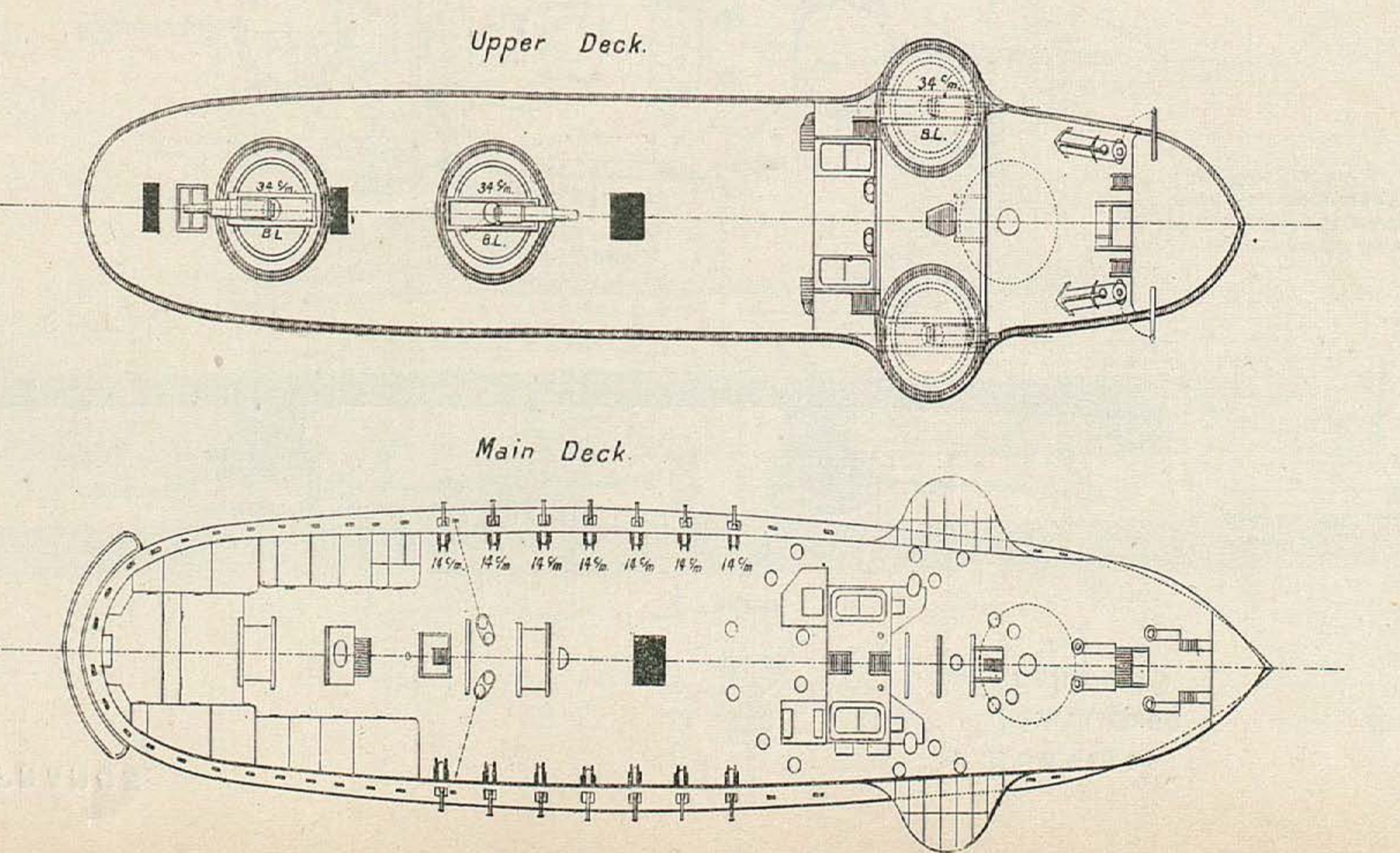


Plate 35.

FRANCE.

(a) "Bouvines"
"Jémmapes"
(a) "Trehouart"
"Valmy"

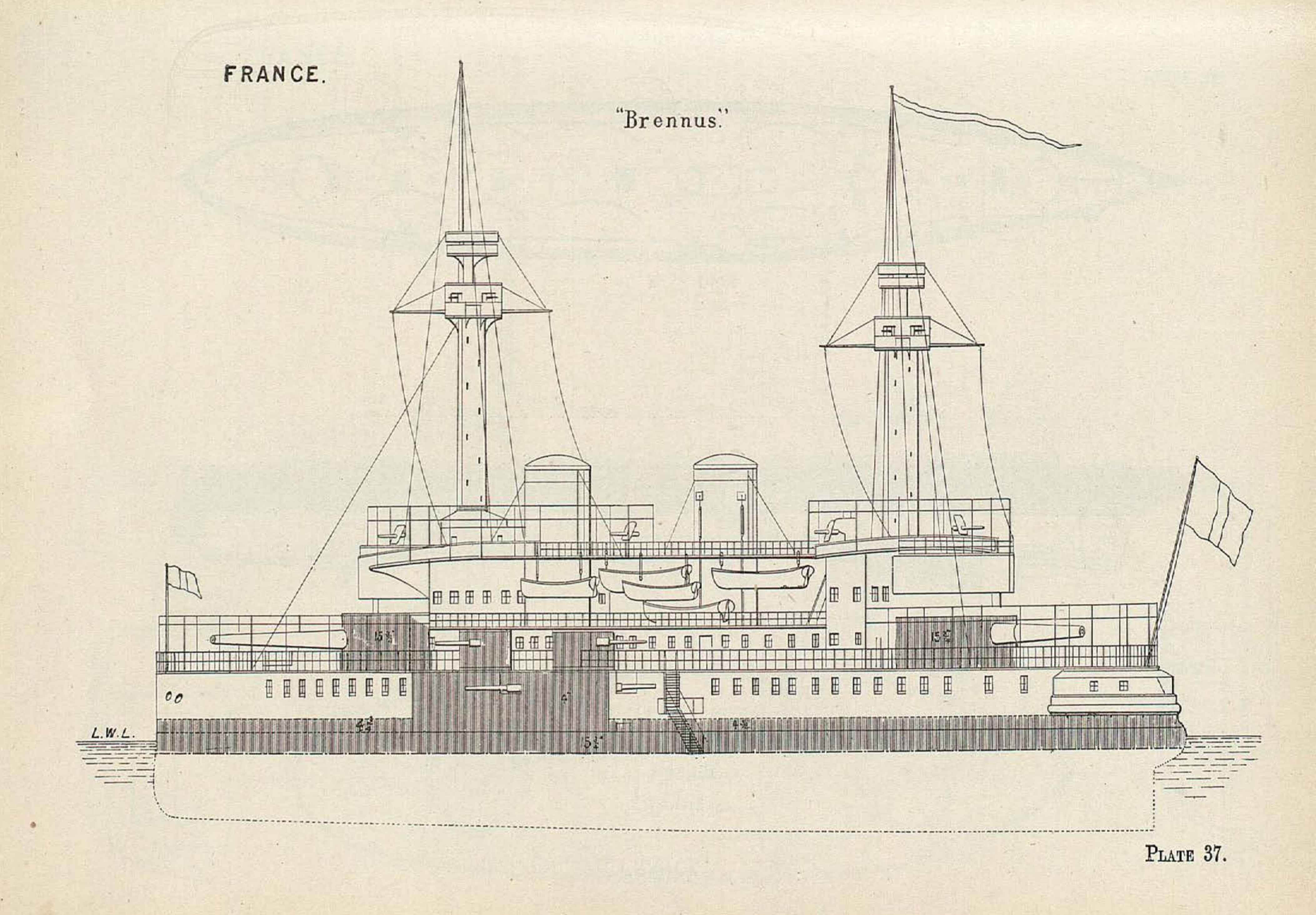
14½"
12½"
17¾"–10"
L.W.L.

Upper Deck

10 m/m Q.F.
34 m/m B.L.

(a) the upper decks of these ships have been raised forward to make them more seaworthy
The other two are as sketch

Armour Deck.


FRANCE.
"Brennus."
L.W.L.
Plate 37.

FRANCE.

"Bruix" class — "Bruix", "Chanzy", "Charner", "Latouche Tréville"

L.W.L.

3½"

Spar Deck

14 c/m Q.F.

14 c/m Q.F.

14 c/m Q.F.

19 c/m B.L.

19 c/m B.L.

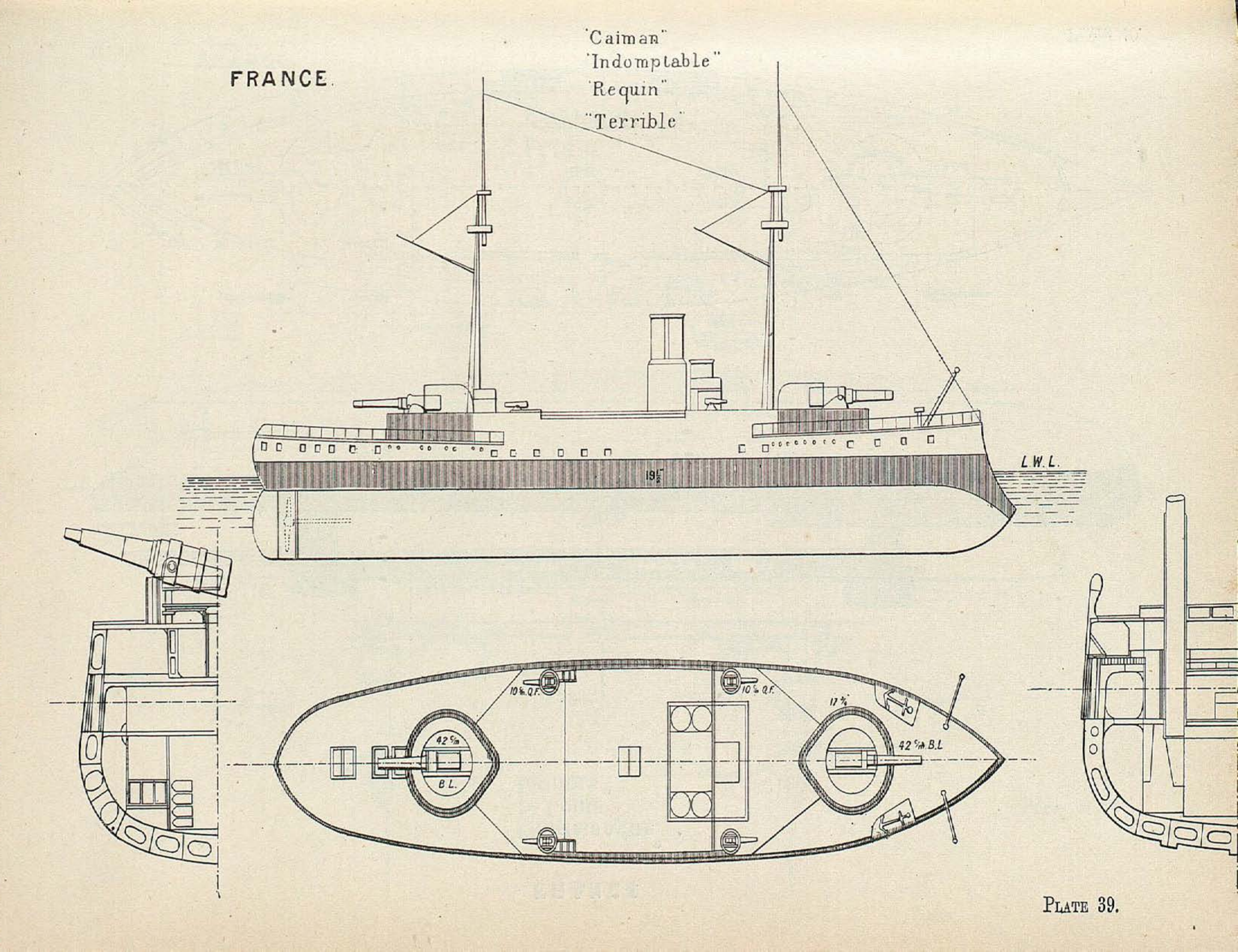

FRANCE.
"Caiman"
"Indomptable"
"Requin"
"Terrible"
L.W.L.
19½"
10 c/m Q.F.
10 c/m Q.F.
17 c/m
42 c/m B.L.
42 c/m B.L.

Plate 39.

FRANCE

"Charlemagne"
"St Louis"
"Gaulois"

15¾ in.
15¾ in.
3 in.
3 in.
3 in.
3 in.
3 in.
3 in.
15¾ in.
9¾ in.

14 C.M. Q.F.
14 C.M. Q.F.
14 C.M. Q.F.
14 C.M. Q.F.
30½ C.M.
30½ C.M.
14 C.M. Q.F.
14 C.M. Q.F.
14 C.M. Q.F.
14 C.M. Q.F.
14 C.M. Q.F.

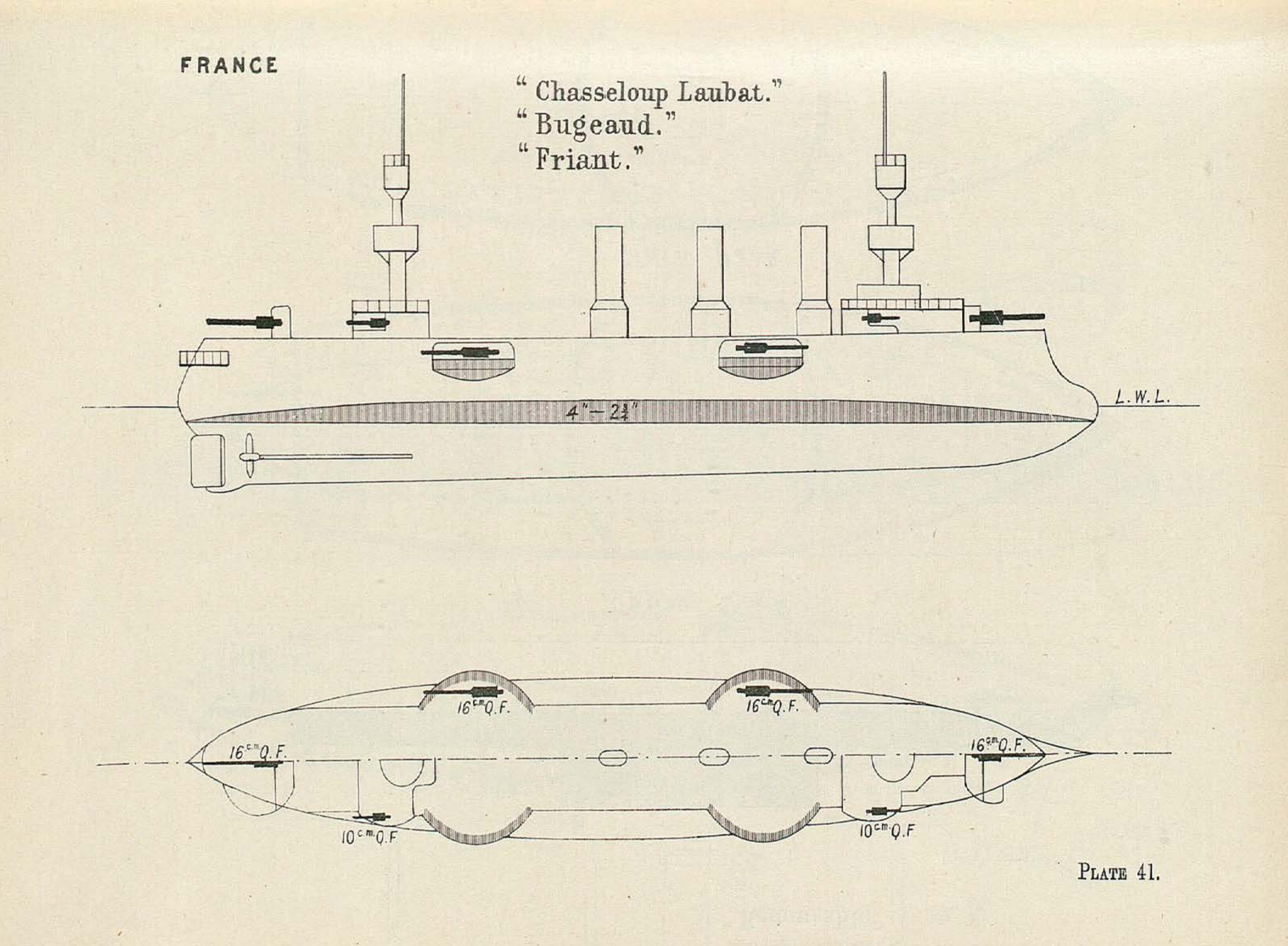

FRANCE
" Chasseloup Laubat."
" Bugeaud."
" Friant."
L. W. L.
4" – 2¾"
16c.m Q. F.
16c.m Q. F.
16c.m Q. F.
16c.m Q. F.
10c.m Q. F
10c.m Q. F

PLATE 41.

FRANCE

"Courbet"
"Devastation"
"Redoutable"

PL. 43

$9\frac{1}{2}$"

$14\frac{3}{4}$"

L.W.L.

Upper Deck

Main Deck

$34\frac{1}{2}^{cm}$ B.L.

$34\frac{1}{2}^{cm}$ B.L.

FRANCE

ARMOURED CRUISERS

"Dupuy-de-Lôme"

L.W.L.

16 c/m Q.F.

19 c/m B.L.

Plate 43.

FRANCE

"Hoche"

34 c/m B.L.
16"
16"
34 c/m B.L
16"
18"
27 c/m. B.L

Plate 44.

"Jauréguiberry."

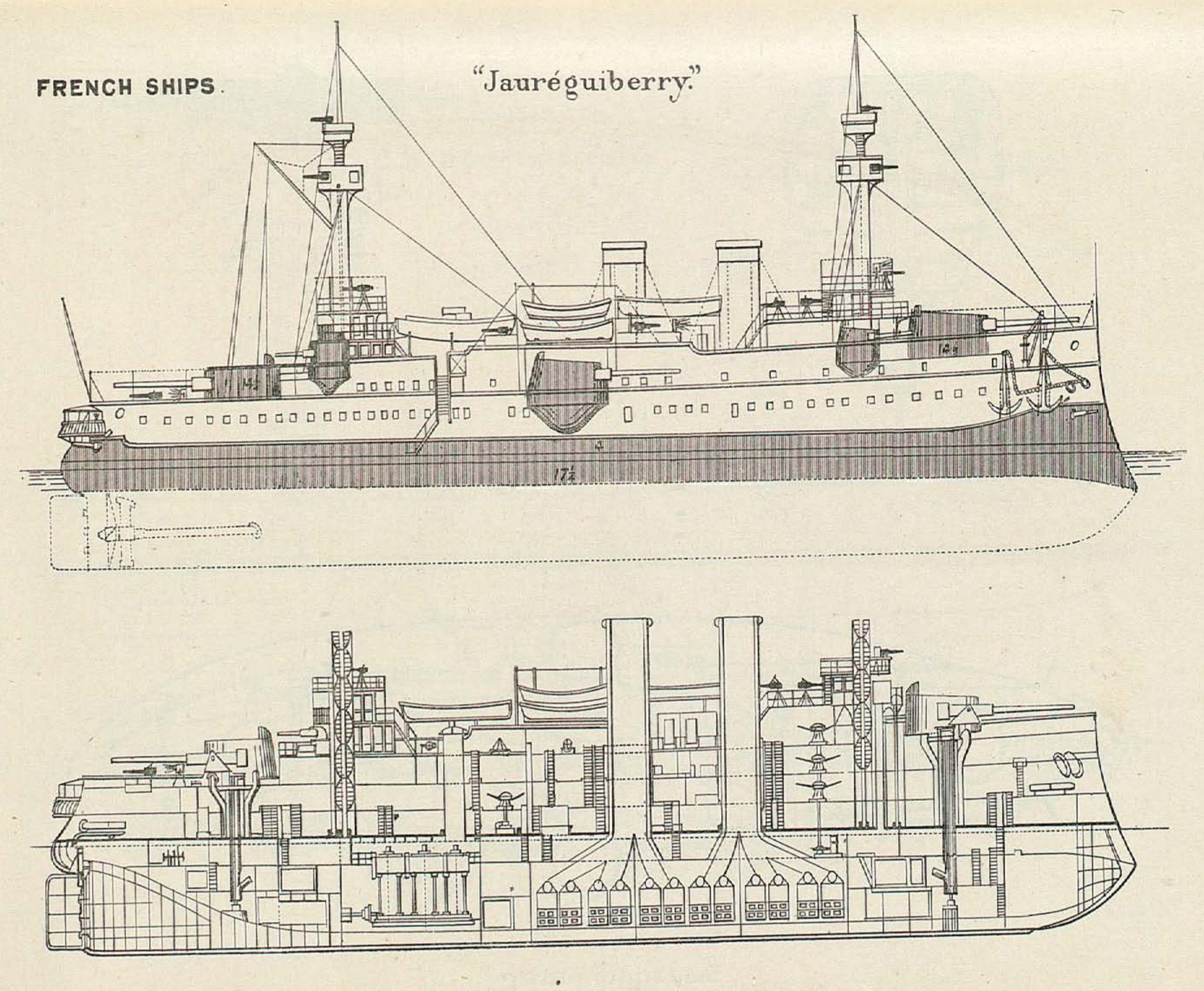
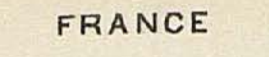


Plate 45.

FRANCE



"Jauréguiberry."

30½ c/m B.L.

14 c/m Q.F.

27 c/m B.L.

14 c/m Q.F.

30½ c/m. B.L.

PLATE 46.

FRANCE

PROTECTED CRUISERS

"Jean-Bart"
"Alger"
"Isly"

3½

16 c/m. Q.F.

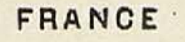
14 c/m. Q.F.

14 c/m. Q.F.

16 c/m Q.F.

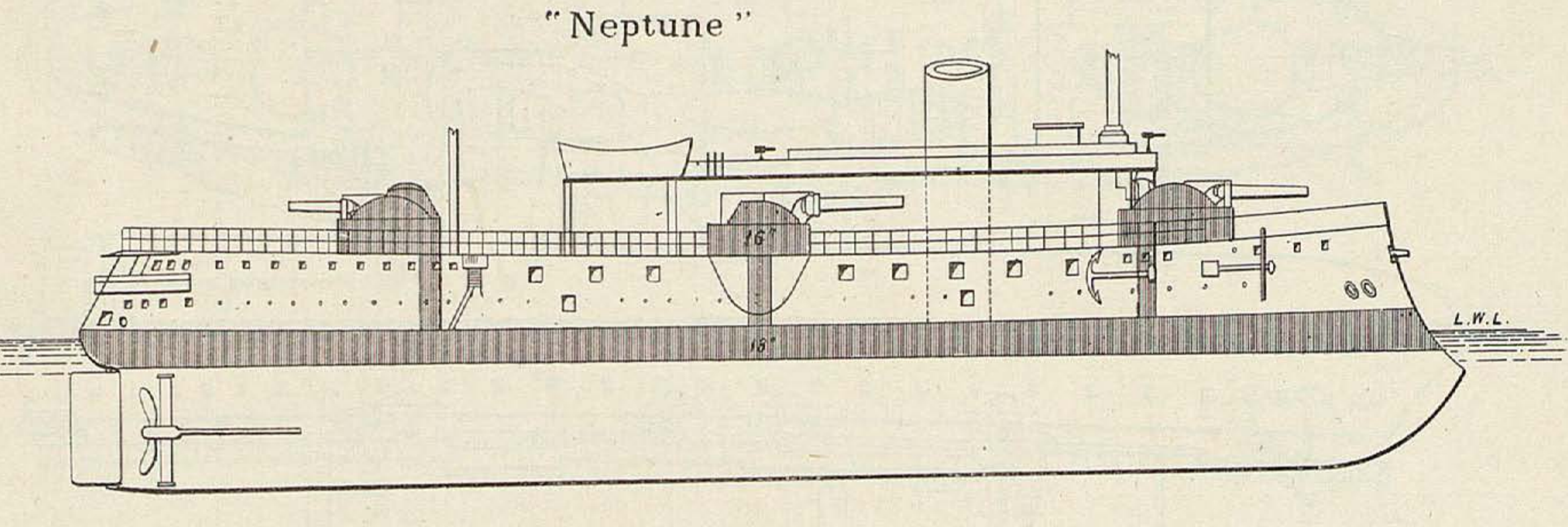
16 c/m Q.F.

PLATE 47.



FRANCE

"Magenta"
"Marceau"
"Neptune"



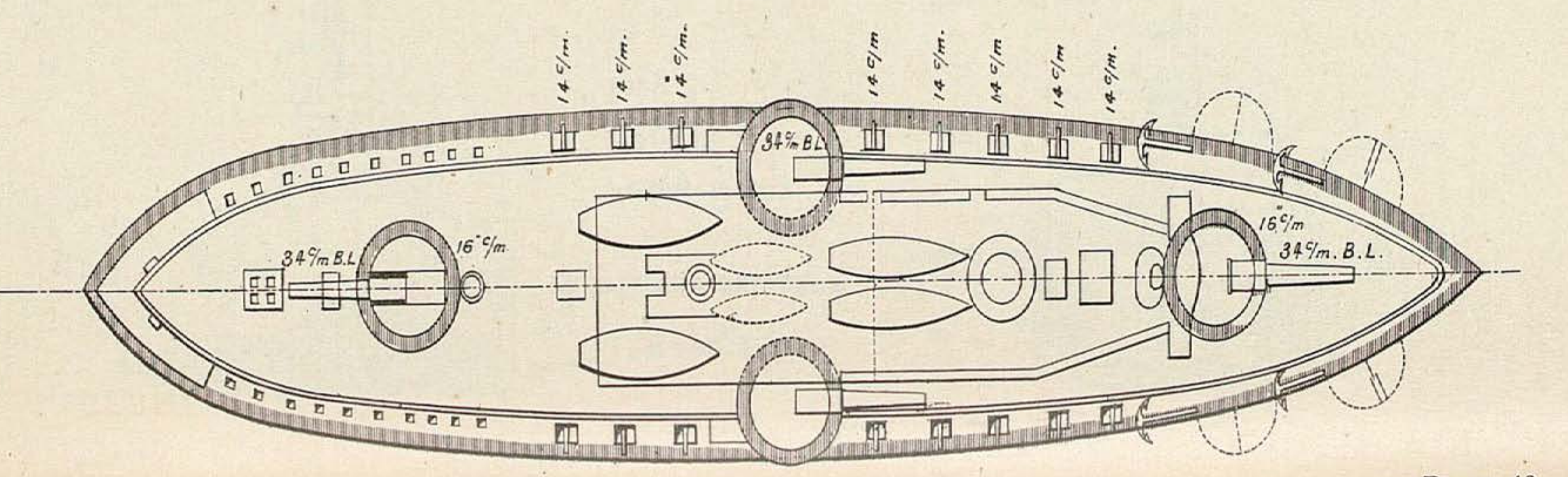
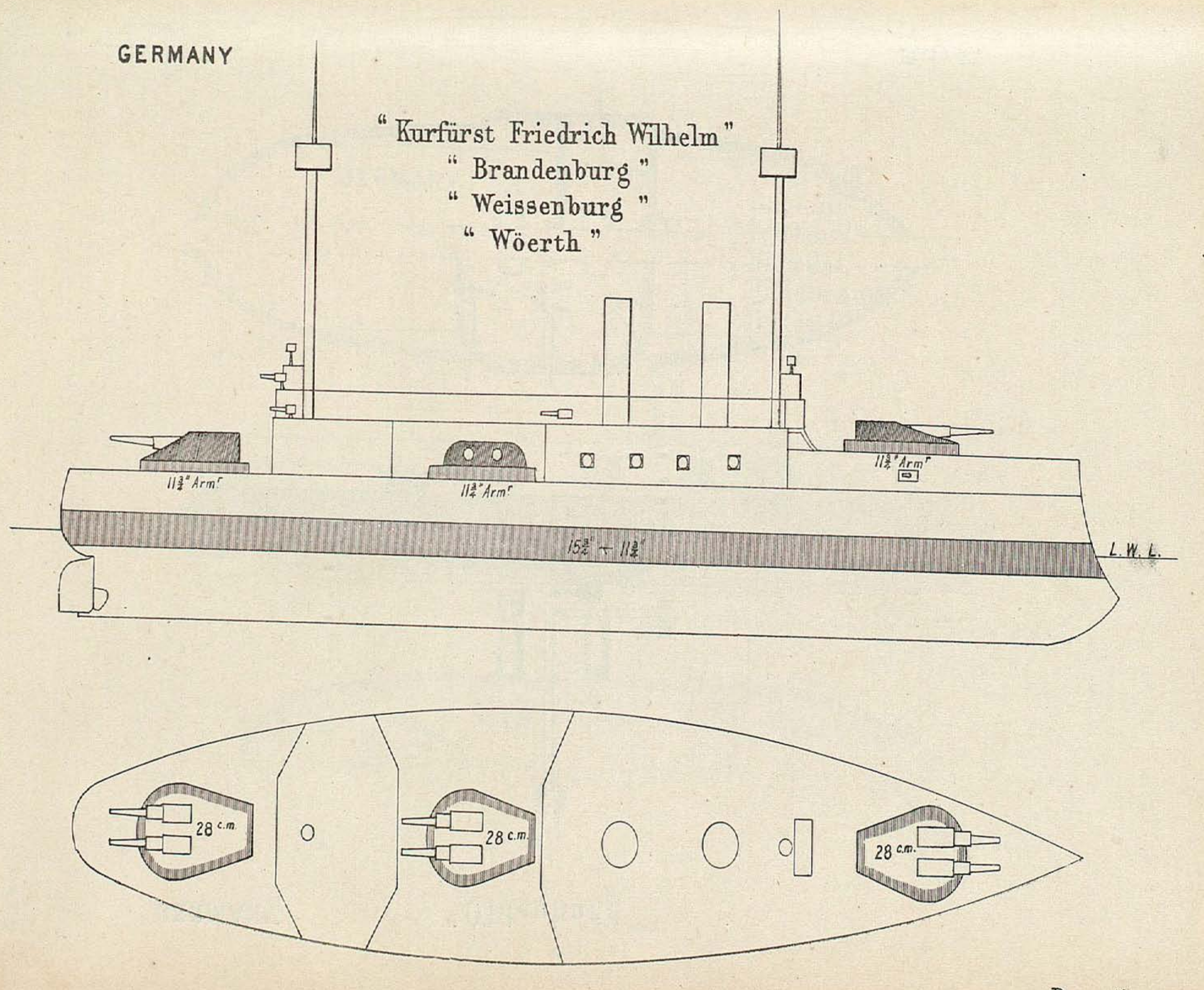
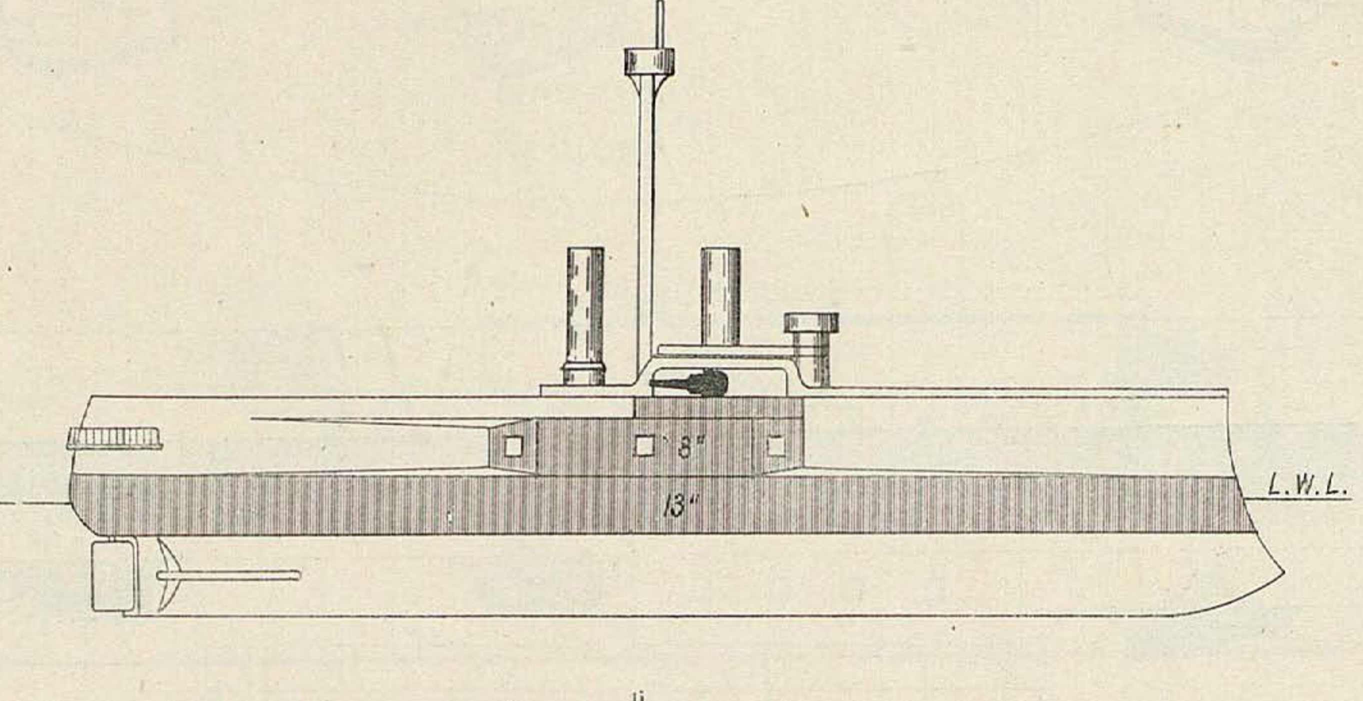


Plate 48.


GERMANY
"Kurfürst Friedrich Wilhelm"
"Brandenburg"
"Weissenburg"
"Wöerth"
11¾" Armr
11¾" Armr
11¾" Armr
15¾" ← 11¾"
L.W.L.
28 c.m.
28 c.m.
28 c.m.

GERMANY

"Oldenburg"



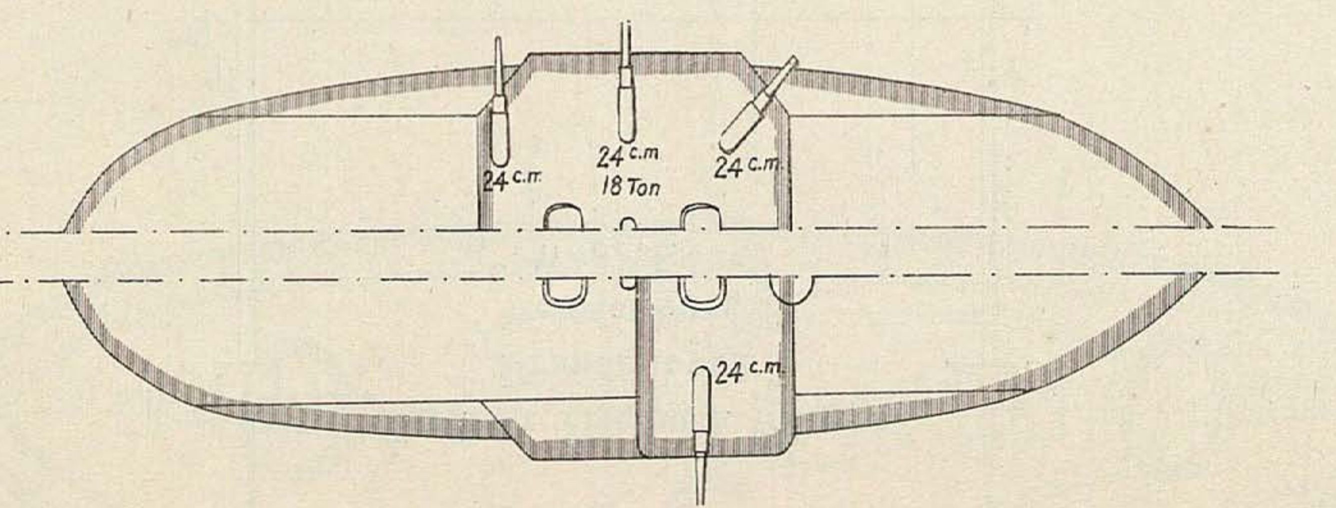


Plate 50.

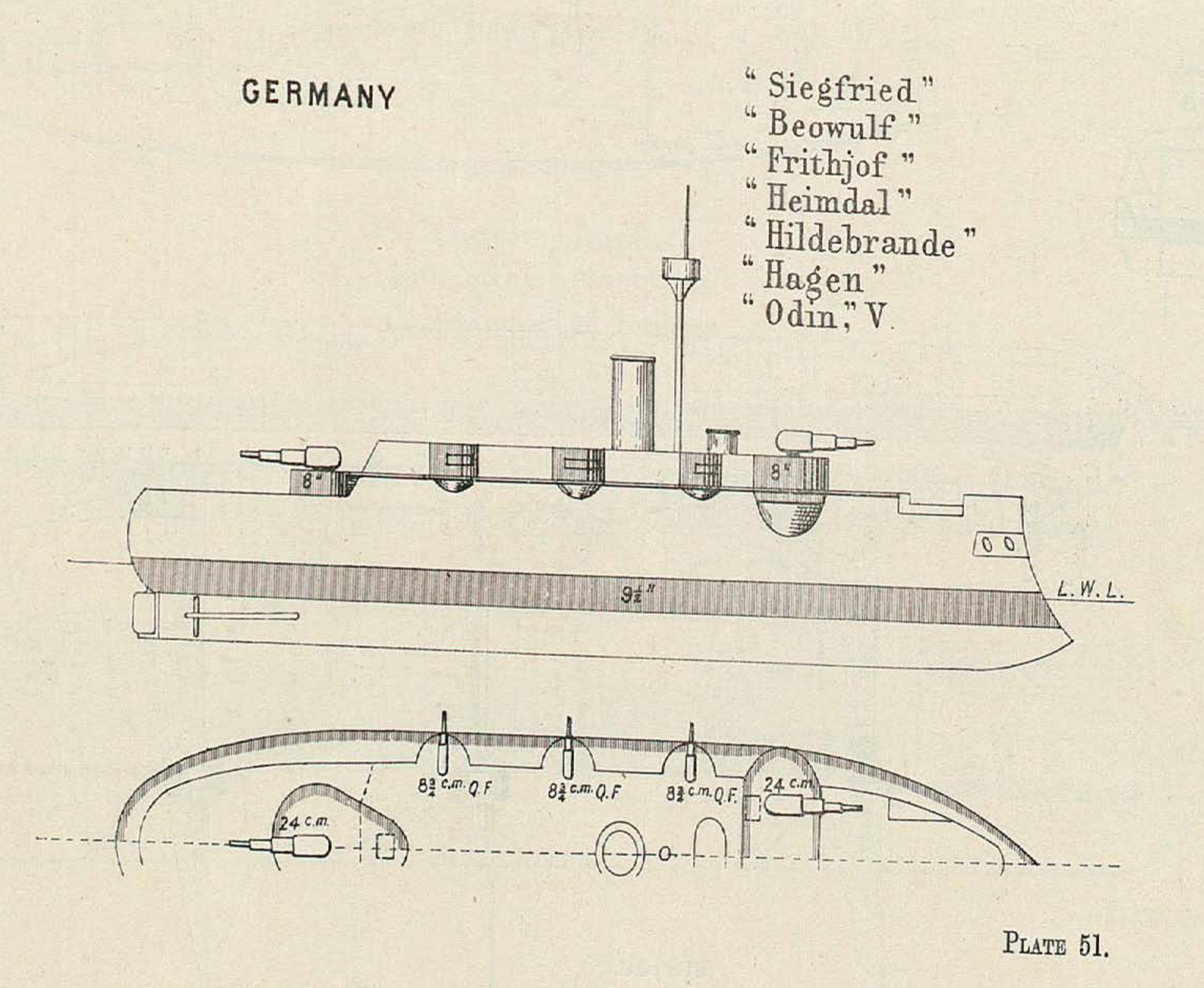
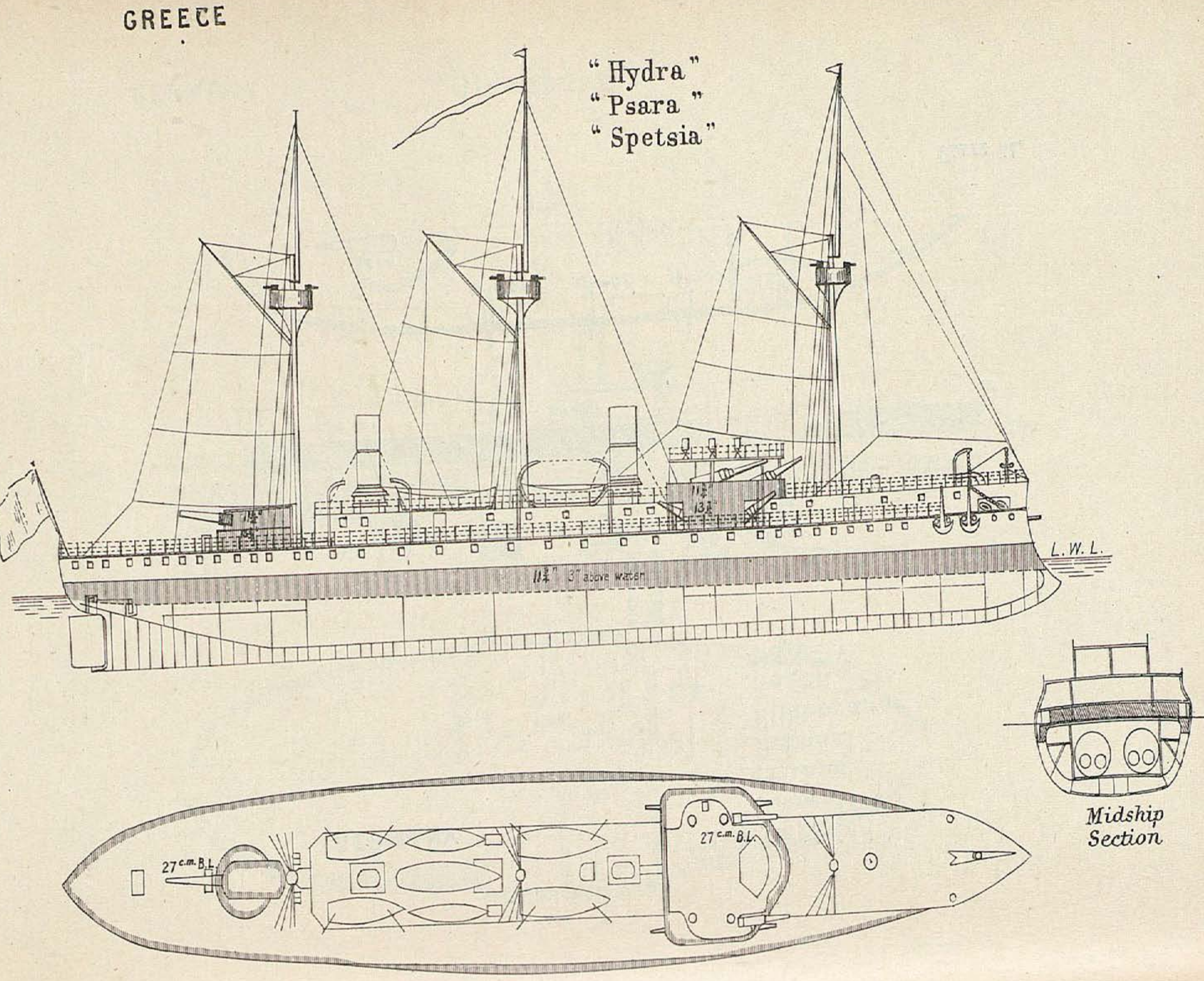

GERMANY
" Siegfried "
" Beowulf "
" Frithjof "
" Heimdal "
" Hildebrande "
" Hagen "
" Odin," V.
8"
8"
9½"
L. W. L.
8¾ c.m. Q.F
8¾ c.m. Q.F
8¾ c.m. Q.F.
24 c.m.
24 c.m.

PLATE 51.


"Hydra"
"Psara"
"Spetsia"
L. W. L.
3' above water
27 c.m. B.L.
27 c.m. B.L.
Midship Section
Upper Deck

ITALY.

"Andrea Doria"
"Francesco Morosini"
"Ruggiero di Lauria"

PLATE 53.

"Garibaldi"
"Varese"

L.W.L.

12 c/m Q.F
12 c/m Q.F
12 c/m Q.F

152 m/m Q.F
152 m/m Q.F
152 m/m Q.F
152 m/m Q.F
152 m/m Q.F

ITALY.

"Italia" and "Lepanto"

16"

19"

16"

L. W. L.

Upper Dcek.

100 ton B.L.

100 ton B.L.

ITALY.

"Italia." and "Lepanto."

Main Deck.

15 c/m B.L and 12 c/m Q.F

Section

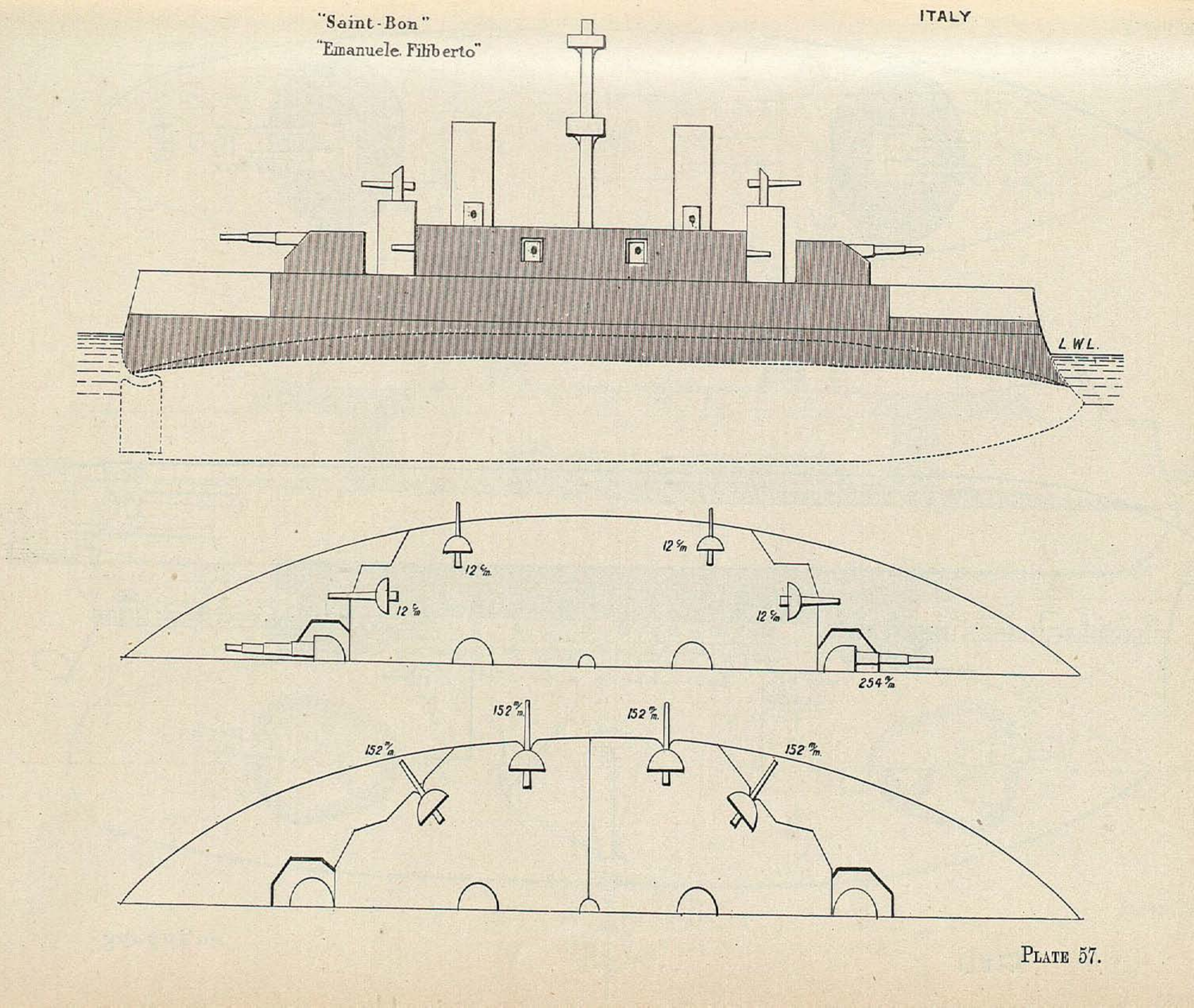
16" Armour

3" Armour

Section

19" Armour

"Saint-Bon"
"Emanuele Filiberto"



"Sardegna"

ITALY

14"
14"
4
L.W.L.
15 c/m Q.F.
15 c/m Q.F
15 c/m Q.F
15 c/m Q.F.
12 c/m Q.F
67 ton B.L
67 ton B.L

ITALY

"Re Umberto"

"Sicilia."

18"

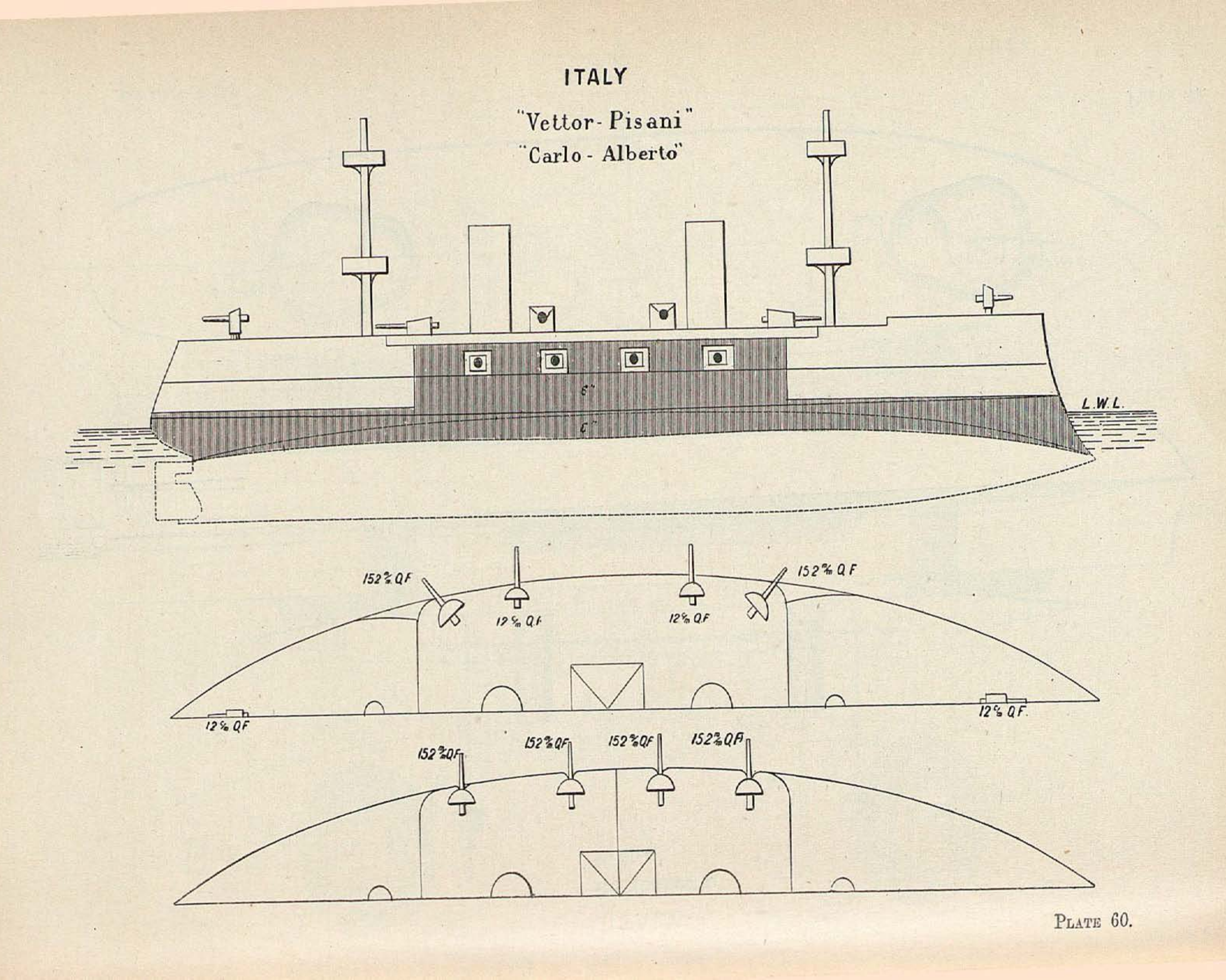
18"

L W L

67 ton BL.

67 ton BL.

PLATE 59.


ITALY
"Vettor-Pisani"
"Carlo-Alberto"
L.W.L.
6"
6"
152 m/m Q.F
12 m/m Q.F
12 m/m Q.F
152 m/m Q.F
12 m/m Q.F
12 m/m Q.F.
152 m/m Q.F
152 m/m Q.F
152 m/m Q.F
152 m/m Q.F

JAPAN.

"Itsukusima"

2"

12 c/m.

12 c/m

12 c/m

12 c/m

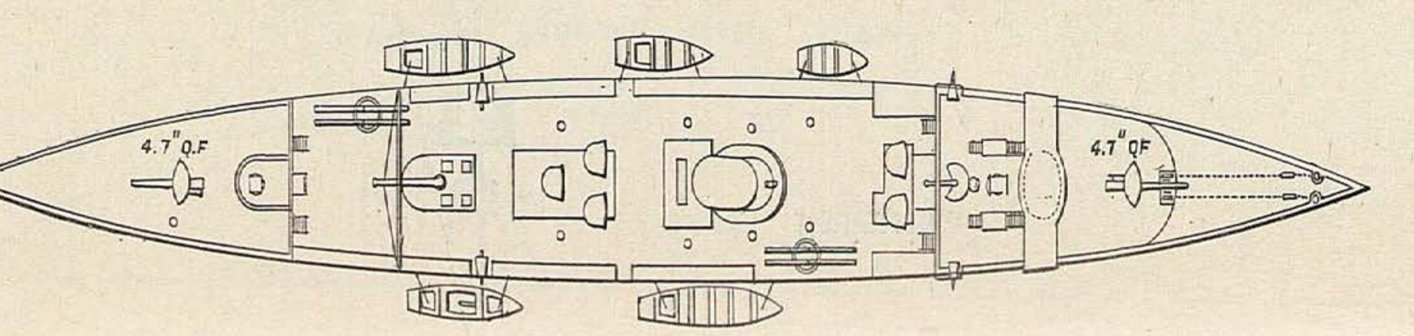
12 c/m.

32 c/m B L

JAPAN

"Tatsuta."

On Special Scale



JAPAN.

"Yoshino."

PLATE 63.

JAPAN.

FIRST CLASS BATTLESHIP.

Nº 1 and Nº 2

4"
18"
C
D
A
B
2½" Armoured Steel Deck
Armoured Belt on Water Line 18"
Armoured Steel Deck 2½"

6" Q.F.
6" Q.F.
18" Armour
6" Q.F.
6" Q.F.
6" Casemates
12 in B.L.
14" Armour
2½"
14" Armour
12 in B.L.
2½" Armoured Deck
4" Armour
4" Armour above Belt
C.D. Upper Citadel
A.B. Lower Citadel

NETHERLANDS

"Evertsen"
"Piet Hein"
"Kortenaer"

L. W. L

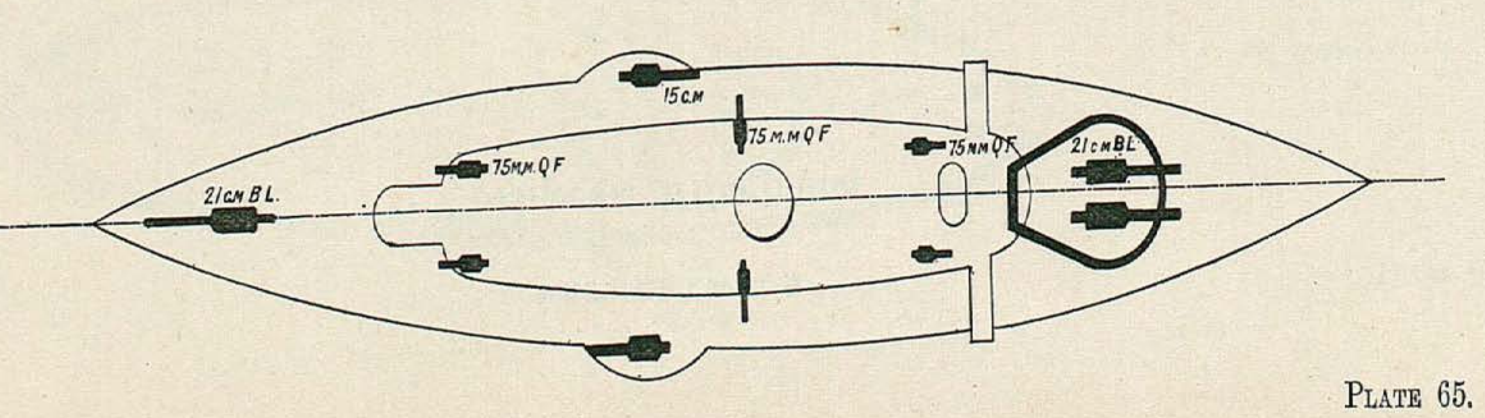


Plate 65.

NETHERLANDS

"Princess Wilhelmina"

3

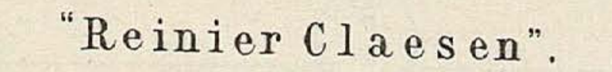
17cm.Bl

21cmBL

28cmBL.

Plate 66.

NETHERLANDS



"Reinier Claesen".

MIDSHIP SECTION

On Special Scale

PLATE 67.

RUSSIA

"Admiral Nachimoff"

PLATE 68.

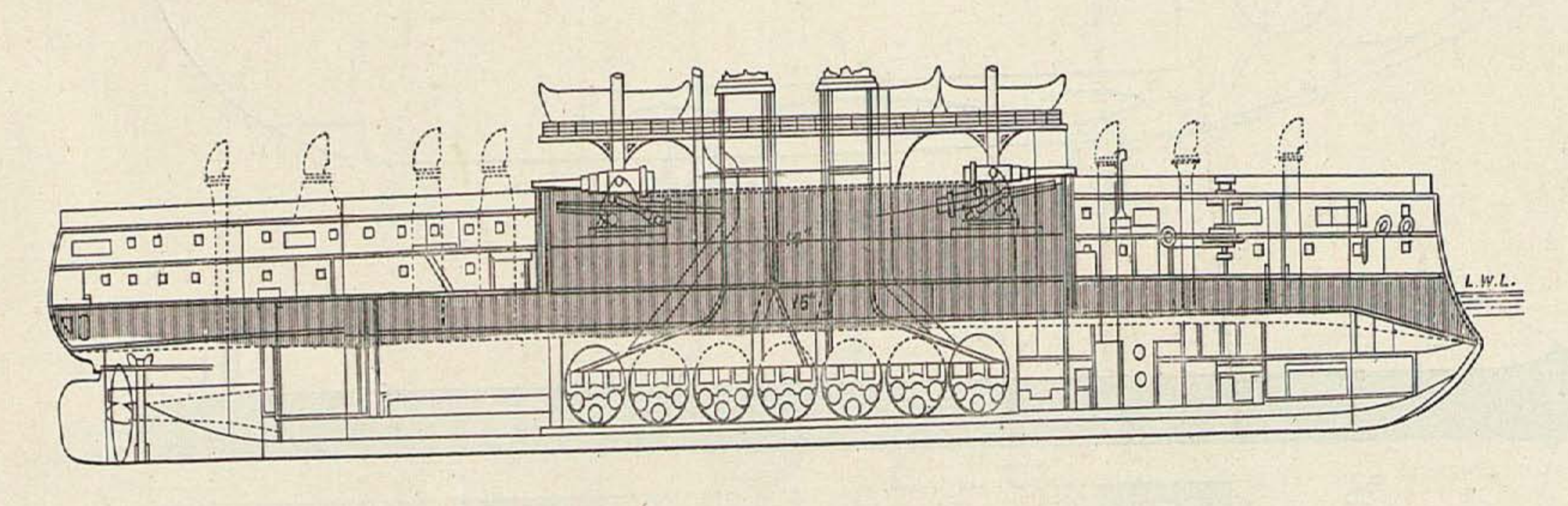
RUSSIA

"Alexander II"

PLATE 69.

RUSSIA.

"Catherine II." "Tchsmé." "Sinope."



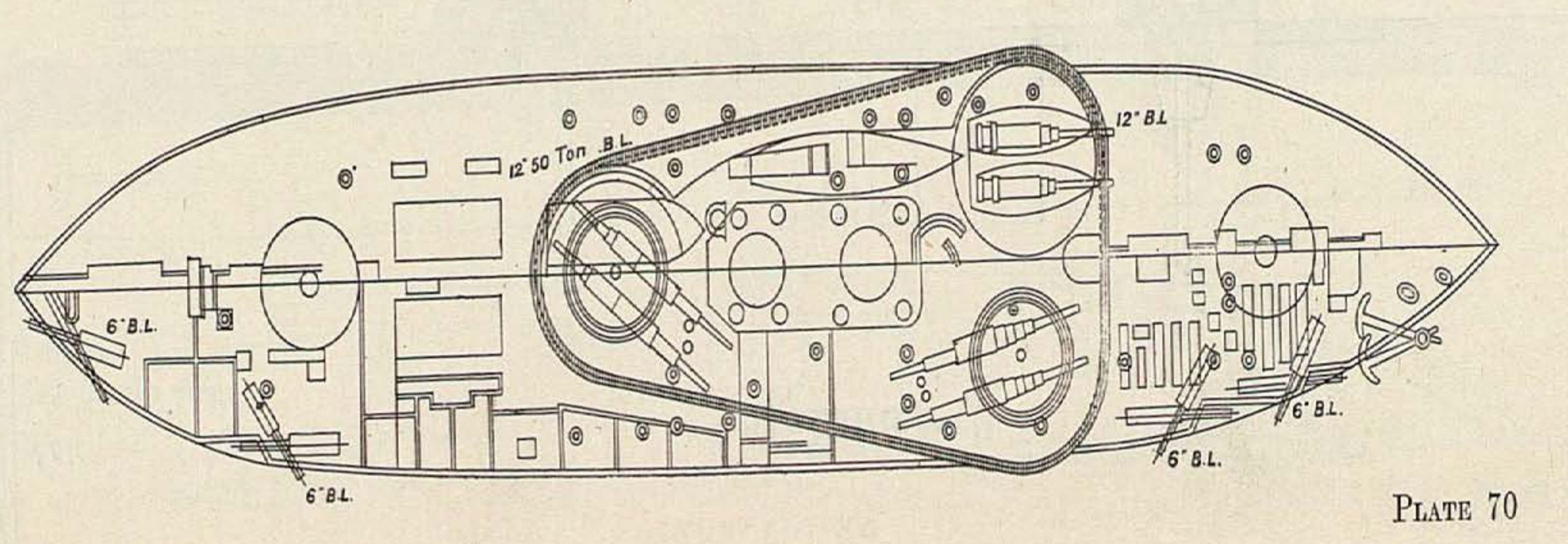
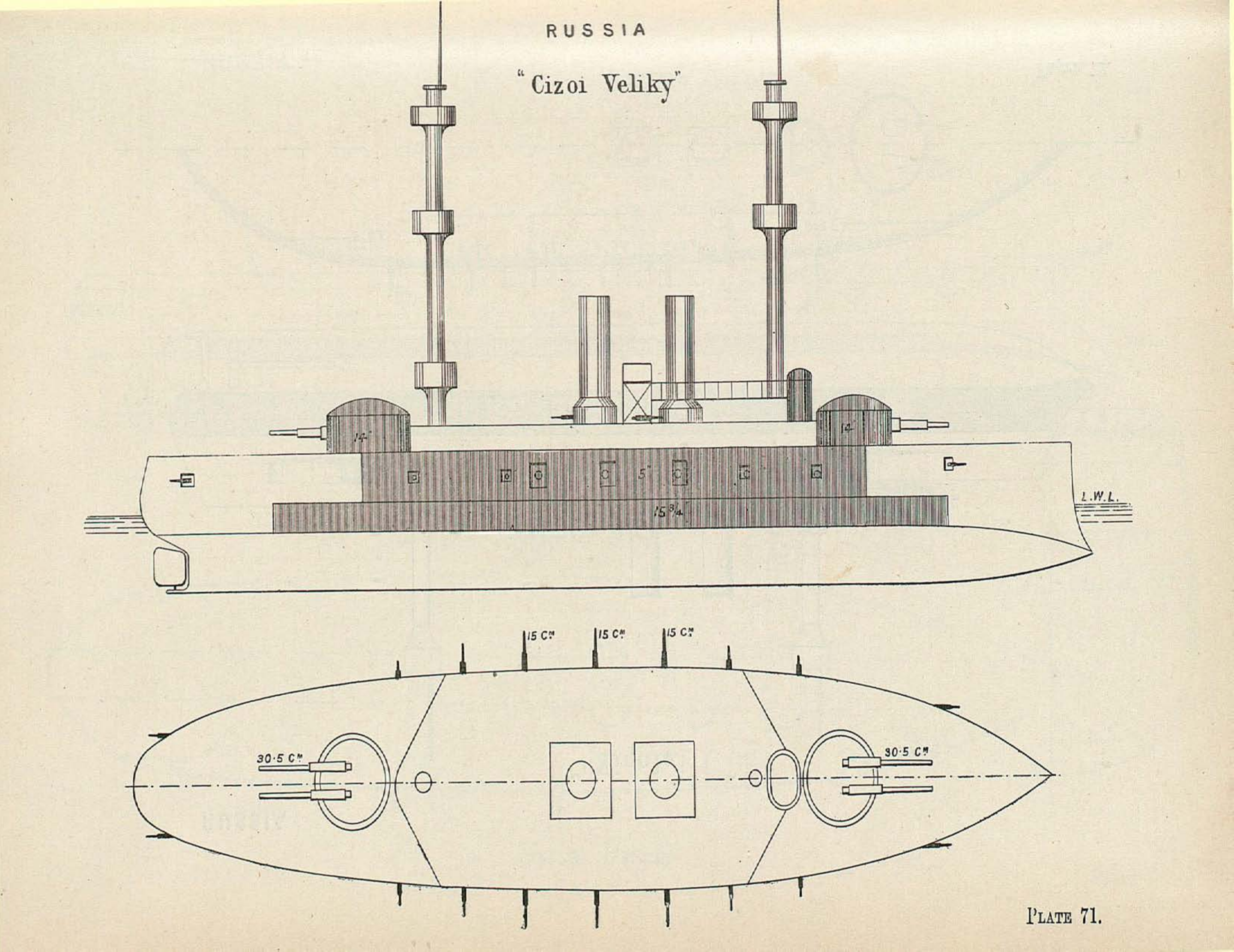


PLATE 70


RUSSIA
"Cizoi Veliky"
14"
14"
5"
15 3/4"
L.W.L.
15 C.m
15 C.m
15 C.m
30·5 C.m
30·5 C.m
PLATE 71.

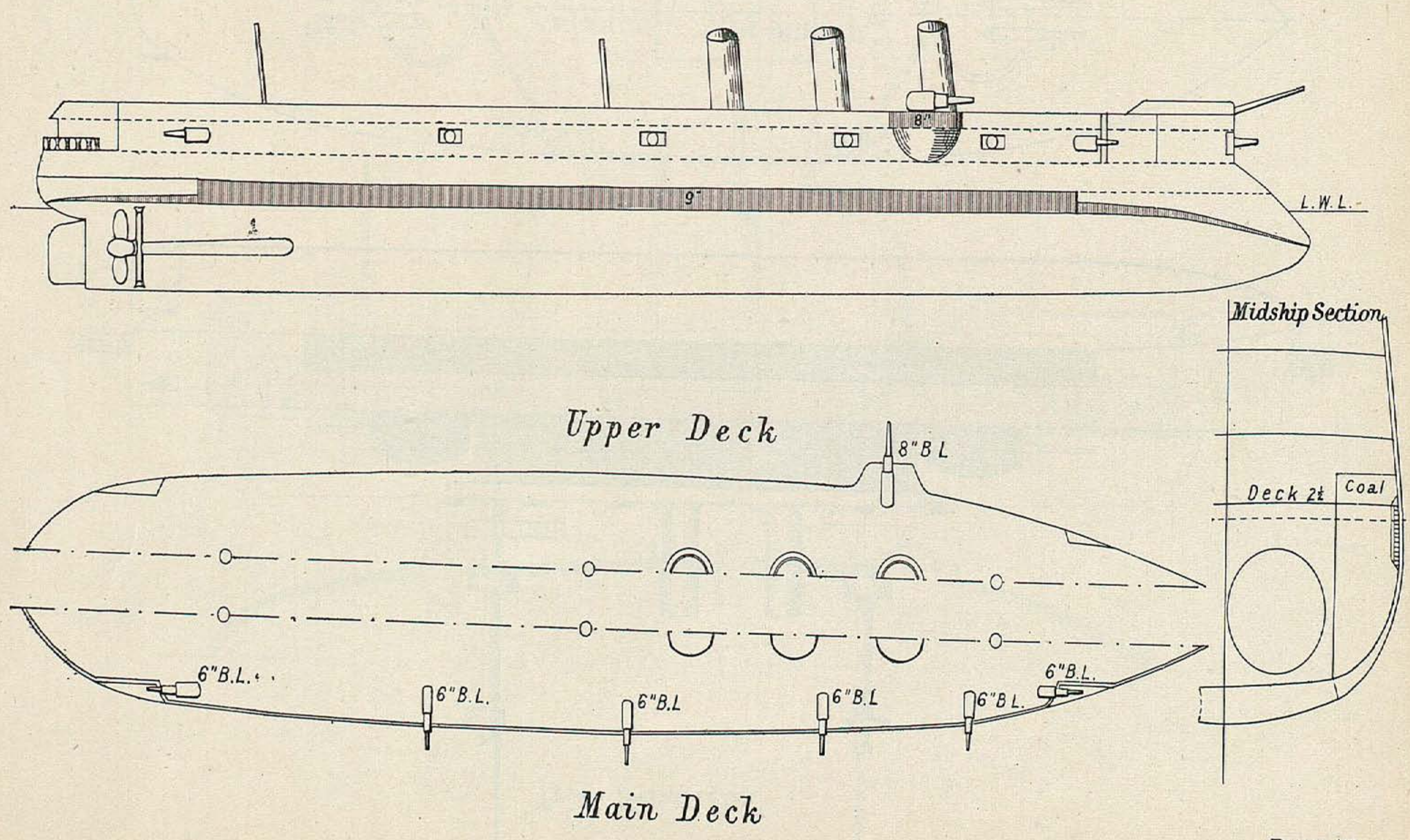
RUSSIA

"Nicolai I."

8"
10"
6"
6"
L. W. L.
14"
6" B.L
6" B.L.
6" B.L
6" B.L
9" B.L.
9" B.L.
12" B.L.

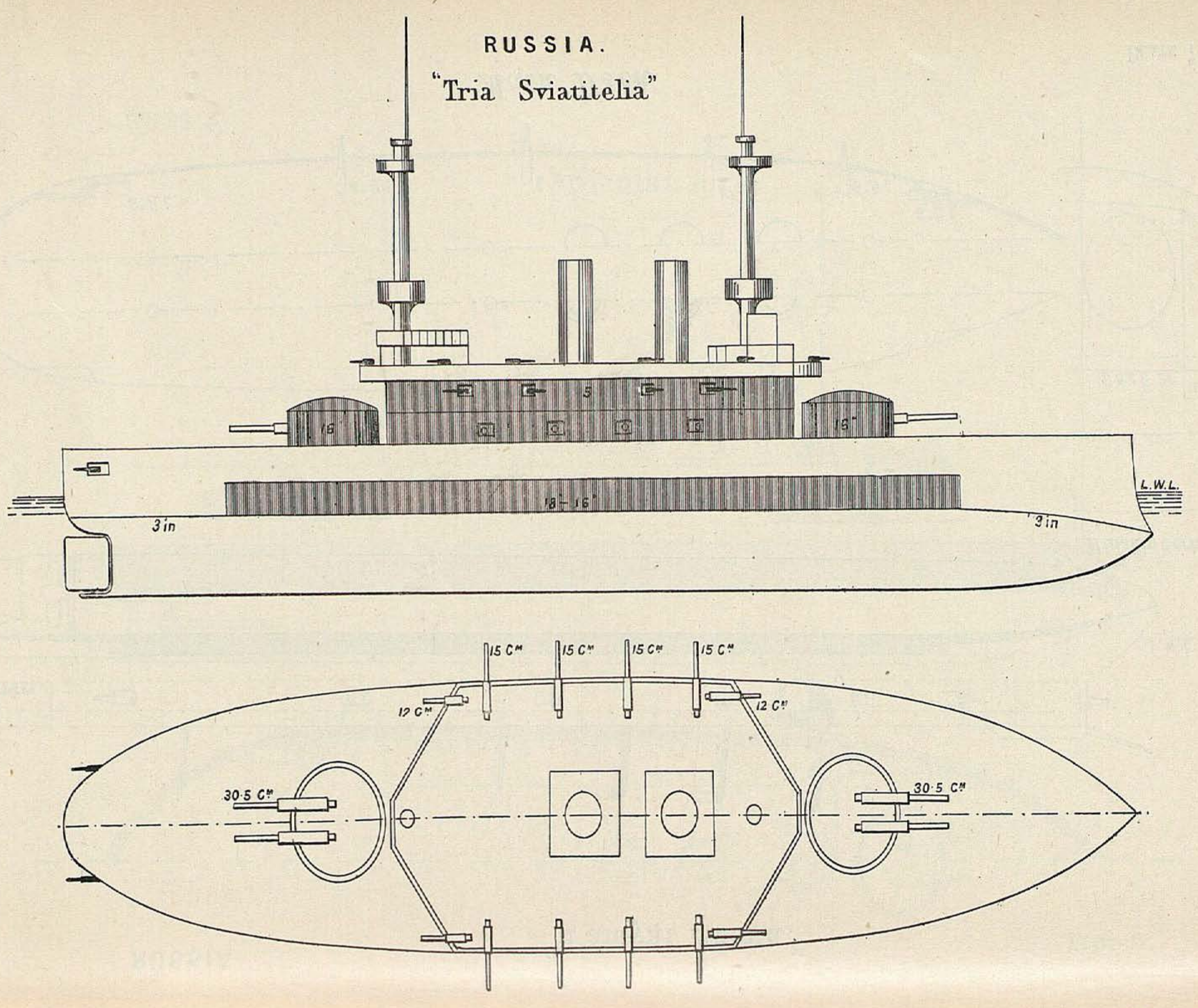
PLATE 72.

"Pamyat Azova."



RUSSIA.

"Tria Sviatitelia"



"Vladimir Monomach"

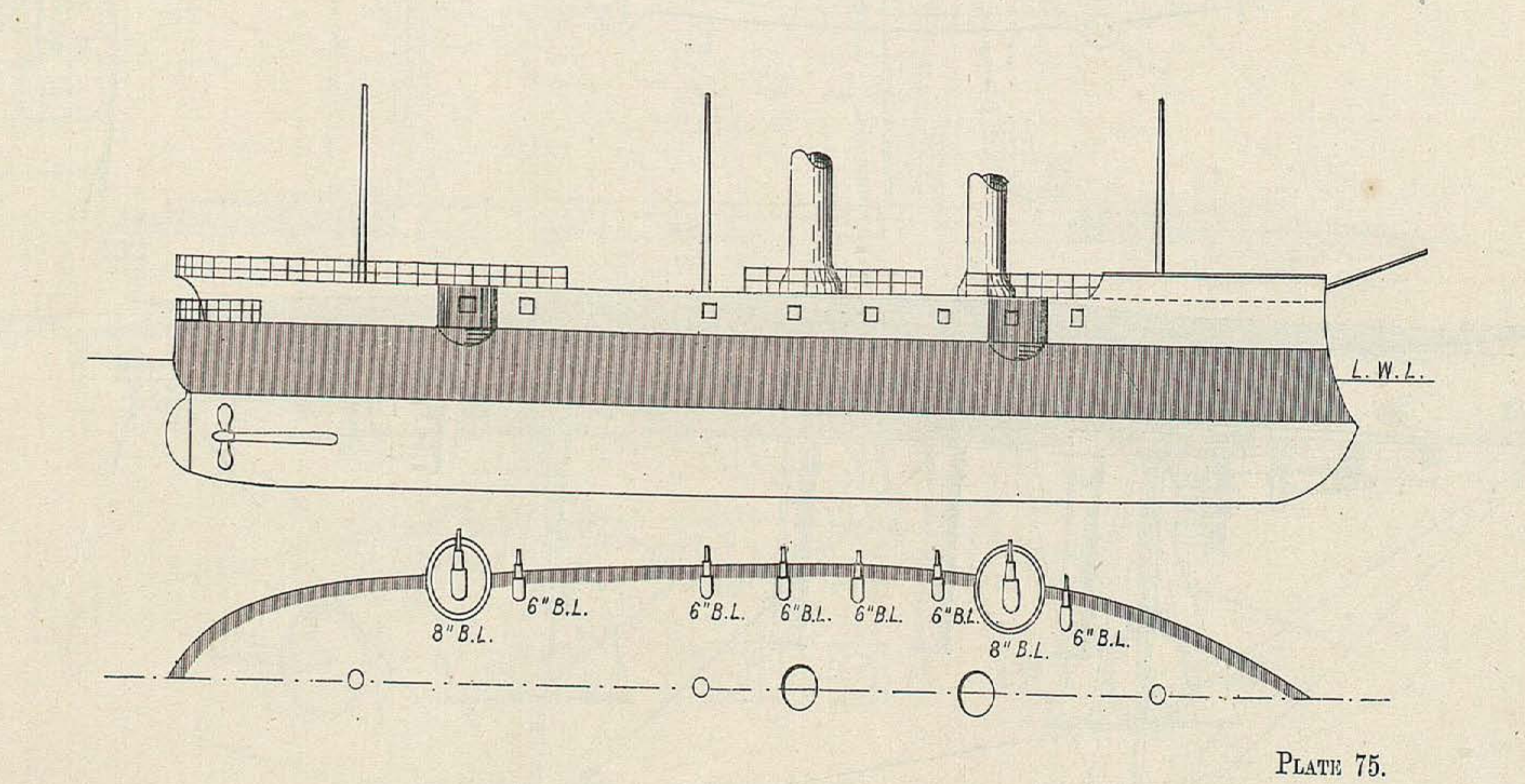


Plate 75.

SPAIN

"Emperador Carlos V."

2"

6 1/8"

COAL

COAL

14 cm Q F.

14 cm Q F.

28 cm BL

28 cm BL.

"Almirante Oquendo"
"Catalũna"
"Cardenal Cisneros"
"Infanta Maria Téresa"
"Princessa de Asturias"
"Vizcaya"

Midship Section.

Coal
Coal
Coal
Coal

$10\frac{1}{2}''$
12"
$10\frac{1}{2}''$
12"
L.W.L.

14 c.m. B.L.
14 c.m. B.L.
14 c.m. B.L.
14 c.m. B.L.
14 c.m. B.L
28 c.m. B.L.
28 c.m. B.L.

PLATE 77.

"Pelayo"

19½"
17½
L. W. L.
12 c.m. B.L.
12 c.m. B.L.
12 c.m. B.L.
12 c.m. B.L.
12 c.m. B.L.
12 c.m. B.L.
12 c.m. B.L.
28 c.m. B.L.
32 c.m. B.L.
19½"
32 c.m. B.L.
16 c.m. B.L.

"Reina Regente"

6" – 3"

L.W.L.

20 c.m. B.L.

12 c.m. B.L.

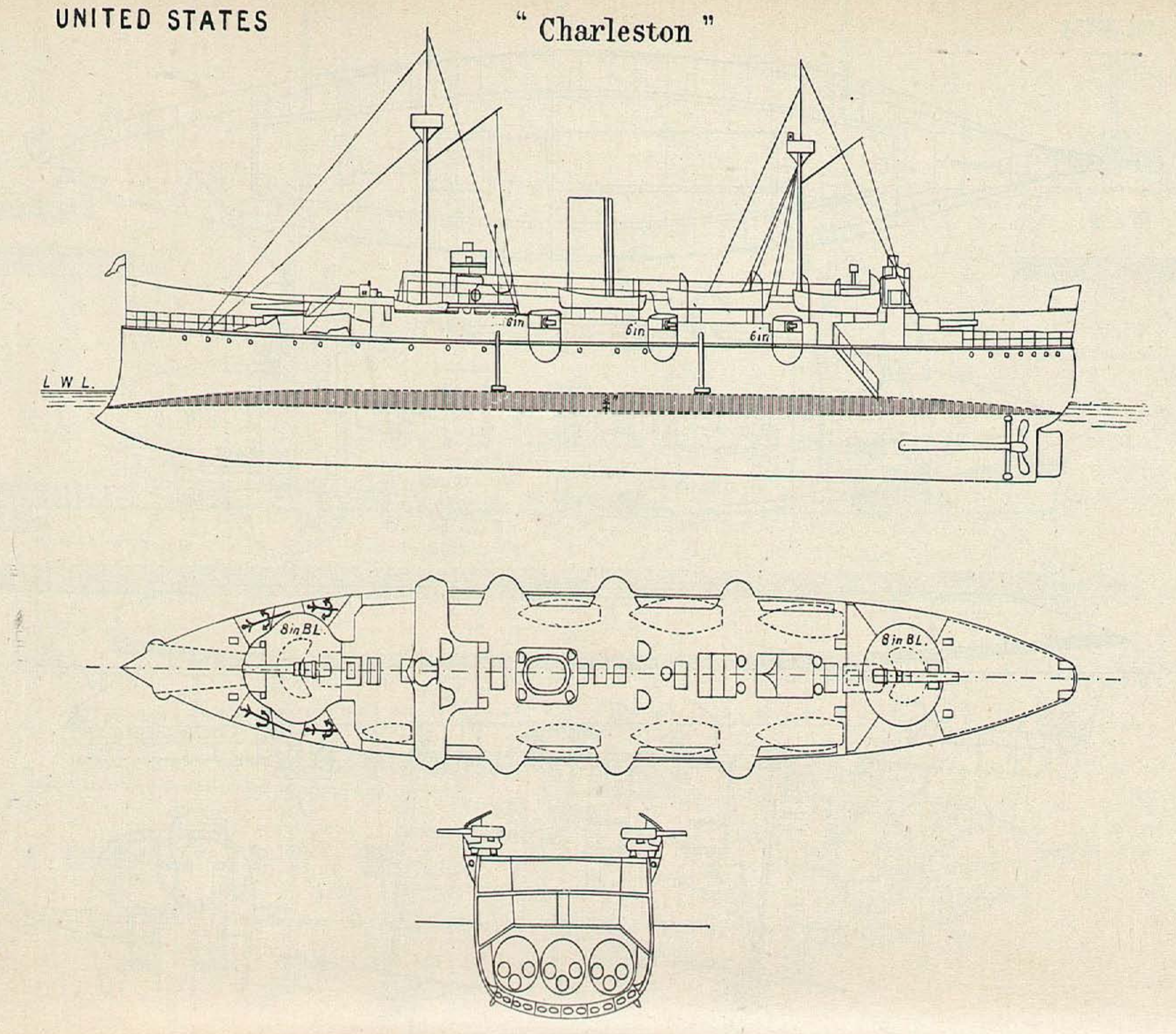
12 c.m. B.L.

12 c.m. B.L.

20 c.m. B.L.

UNITED STATES

"Charleston"



TRIPLE SCREW PROTECTED CRUISERS COLUMBIA & MINNEAPOLIS.

4'-2½"

"Columbia"
"Minneapolis"

Upper Deck

Main Deck

Midship Section

Engine Hatch

Engines

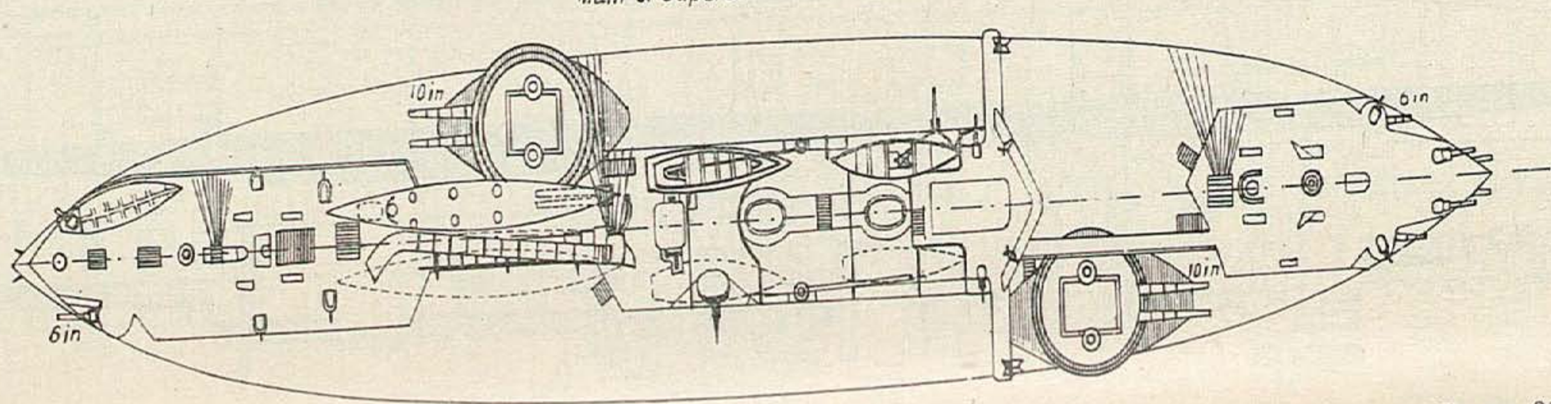
(a)

(a) Water excluding material

f

UNITED STATES

Armoured Cruiser "Maine"



UNITED STATES

Coast Defence Ship

"Monterey"

L.W.L.

11

14

13½"

Midship Section.

On Special Scale

10in BL.

6cm QF

6cm QF

6cm QF

12in BL.

Plate 83.

UNITED STATES

"New York"

10"
10"
4"
L. W. L.
8 in
8 in
8 in

Plate 84.

UNITED STATES

BATTLE SHIPS.

"Oregon"
"Massachusets"
"Indiana"

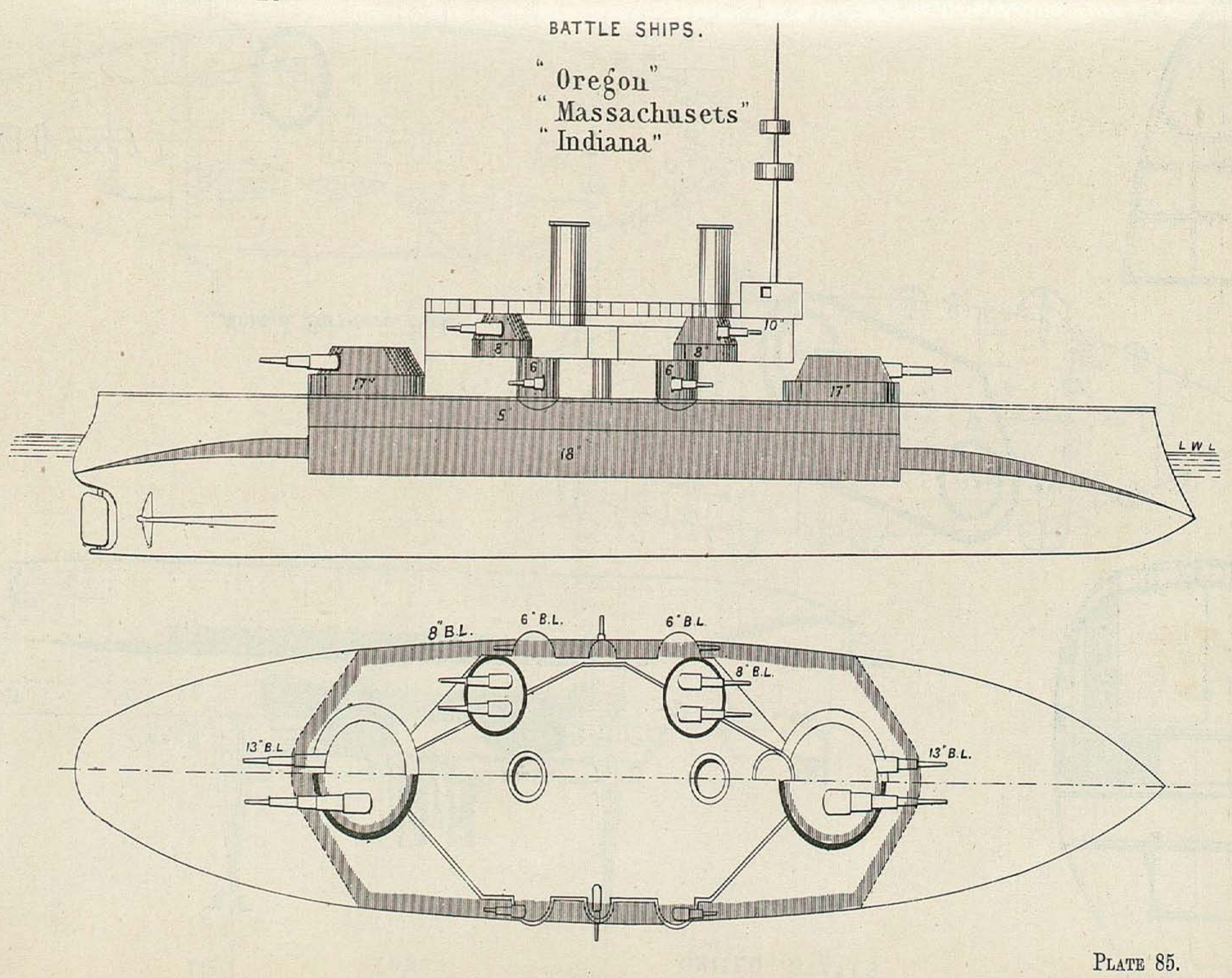
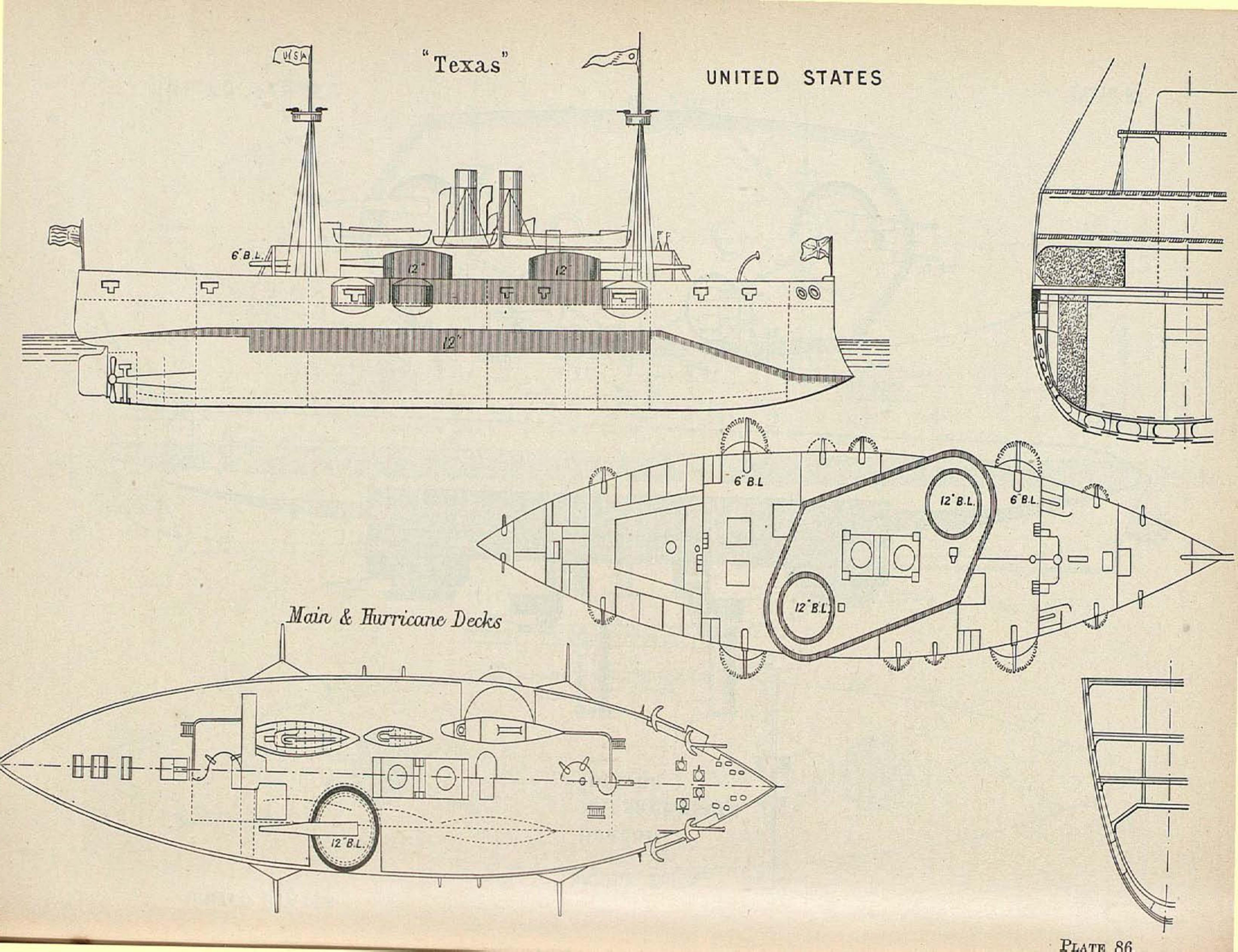


PLATE 85.


"Texas"
UNITED STATES
U.S.A.
6" B.L.
12"
12"
12"
6" B.L
12" B.L.
6" B.L.
12" B.L.
Main & Hurricane Decks
12" B.L.

PART III.

ARMOUR AND ORDNANCE.

On the other hand, while the Chinese had heavy guns, they were very deficient in quick-fire, and, with bad artillerists, they were unlikely to deliver their comparatively few shot to much purpose on the distant and rapidly moving enemy. In short, although one Chinese shell caused terrible havoc on the Matsusima, it might almost be said that, while the Japanese could not hit hard enough, the Chinese could not hit at all.

The chief interest as to the behaviour of armour attaches to the case of the Ting Yuen and Chen Yuen. These two big ships appear to have met the heaviest concentrated attack of the Japanese, and to have borne it well. The upper structures were riddled, but though hundreds of hits were made on their armour, no damage beyond indents of about 3 inches appears to have been effected. The value of armour could scarcely be better illustrated, for the ships probably owed their escape from entire destruction to it. There is one feature that specially concerns England. Both these vessels have belt-armour only amidships for a length of about 145 ft., and about 85 ft. measured from the bows is defended from vital injury only by a horizontal armoured deck. These vessels probably fought to a great extent head on. Consequently, they were exposed to the trial that the advocates of complete belts urge would prove fatal to them—that is overpowering shell attacks forward; yet they do not appear to have suffered in the way that has been predicted. No question of the stability and safety of either of the ships has been raised.

Treated and untreated armour plates.

Armour plates treated on the Harvey, Tresidder or similar processes have long been thoroughly taken up in the United States, in this country, and in a less marked way on the continent, where their value has been doubted. In the *Annual* of 1894 it was mentioned that, under certain conditions, treated plates had failed to stop shot better than untreated ones. Some experiments have been since made which appeared to show that the peculiar action and power of treated plates had not been clearly understood. This action consists in the fracture of the shot's point on first impact, and it depends on the hardness of the plate face and the velocity of impact. There is nothing to be wondered at, then, that at low velocities fracture might not be effected, and consequently that the plate might not behave very differently from an untreated plate. At Texel, in the autumn of 1893, projectiles actually entered more deeply into the treated than into the untreated armour. This must surely be accounted for by supposing that the back portion of the treated plate was softer than the mass of the untreated, a very natural supposition, for it appears to be difficult to get hardness in the mass of the treated plates, the tendency of the Harvey process being to soften the parts which are

not carburized. This is a matter which ought to admit of correction in time.

Lieut. Weaver, U.S. Artillery, on armour.

On the other hand, it is less easy to understand certain facts which are dealt with in a very able paper by Lieutenant Weaver, U.S. Artillery, in the *Journal of the United States Artillery* of July, 1894. It appears that at Gâvre in April, 1893, a 9-in. shot, striking a 10·54 Harveyed plate with a velocity of 1901 ft.-secs., broke up, effecting a penetration of 6·6 in. only, while shot fired with 2296 and 2132 ft.-secs. passed completely through the same plate unbroken and went on up the range. The tendency to escape fracture when the velocity is increased is seen in other experiments quoted by the writer. Thus, at Indian Head four 10-in. Holtzer projectiles were fired at a 14-in. Harveyed nickel-steel plate in February, 1893, at velocities increasing from 1472 to 2059 ft.-secs. These all broke in the plate with penetrations increasing from 2 in. to 11 in. as the velocity increased. The remarkable feature is that the shot was less broken as the velocity increased. Incidents in the Nettle and Ochta trials are quoted, showing the same tendency of the shot to break less as the velocity increases. Generally speaking, the limited results of trials bearing on this point appear to indicate that the hard face breaks the shot's point best at from 1600 to perhaps 1900 or 2000 ft.-secs. velocity.* A crude explanation of these facts may be suggested, namely, that below 1600 ft.-secs. velocity the blow is not sufficient to break the shot's point, while above 1900 ft.-secs., although the blow is abundantly sufficient, the time is too short to develop fracture on the shot before it is through the hard skin. At present, however, the question is a doubtful and obscure one. Probably on service a large proportion of armour-piercing shot would strike at velocities between 1600 and 2000 ft.-secs. when the treated face acts well, but even here its power is seriously threatened by the use of caps of wrought iron and steel fixed on the shots' points. The power of this device to enable the shot to escape fracture and to perforate a treated plate was demonstrated at Ochta in Russia, and has been seen in trials subsequently repeated elsewhere. There can be little doubt that this in a measure discounts the advantage of the hard-treated face; nevertheless it can scarcely be questioned that it is sound in principle to harden the surface of armour and throw all possible shock and strain on the projectile before it enters and obtains any support round its point. Experience should cure the tendency to softness in the plate's back, and the chances of obliquity in

* Captain Tresidder has described the action of a shot's point on impact in an admirable paper published in the Proceedings of the R. E. Institution.

striking in action would probably increase the effects of the hard-treated face.

It was mentioned in last year's *Annual* that Mr. C. E. Ellis * estimated the resisting power of treated plates as 50 per cent. greater than that of the best plates of 1888. This may serve for a rough sort of guess, but it may be seen from the above that any such estimate must be regarded as quite uncertain. It depends for success in fracture of the shot. When the shot holds together, intact, its action is regular and admits of calculation, but how can we calculate what powers may remain in a broken tool ?

Capped shot.

The action of the cap has not been always clearly apprehended. Both in Russia and elsewhere capped shot have been fired against untreated steel. A cap, if it prevents fracture, may greatly assist a shot in performing its work, but to apply a cap to a projectile under circumstances when it was not liable to break could not well benefit it in any way. On the contrary, it must indeed slightly add to the work to be done by the shot, though perhaps not appreciably.

It will be seen from examples quoted hereafter that very thick treated plates have repeatedly exhibited powers which could hardly have been expected, seeing that the effect of the treatment extends but a short distance into the mass.

In last year's *Annual* the difficulty of drilling holes into the face of treated plates was mentioned. This it was stated could be got over by the use of the electric arc drill when the plates were made without nickel. It has, however, been found easier to drill the holes required before treatment, and fill them up with the loosely fitting metal plugs and ganister, which can afterwards be removed without difficulty. It was found by experiment in the United States that treated plates which may appear to be very faulty, owing to the existence of face cracks, may not suffer sensibly in resisting power.

In the matter of Harvey armour, the conclusions arrived at in the United States naturally deserve special attention, and none the less because they do not in all respects agree with those adopted in this country.

Captain Sampson on treated armour.

Captain Sampson, U.S.N., Chief of the Bureau of Ordnance, has contributed a paper to the American Society of Naval Architects on

* It must not be supposed that treated plates compare as favourably as this with untreated plates now made, which have sometimes displayed extraordinary advance in resisting power. Treated plates have hitherto been considered, as noticed above, equal to untreated ones of 50 per cent. greater thickness: for example, a 6-in. treated would be considered a match for a 9-in. untreated plate. It would not now, however, be correct to reckon on such an estimate, both because untreated plates have been greatly improved, and also because the use of a cap on a shot prevents fracture and entirely upsets the ground on which such an estimate is made.

the "Present Status of Face-hardened Armour." The position of the author and the importance of American investigation in this question give special weight to this paper. The author states that although the shrinkage and change of angles in the various processes of cementation and tempering involved in face hardening, complicated by those of bending and rectification, seem to follow no definite law, still manufacturers have succeeded in foreseeing them with sufficient clearness to make most satisfactory butts and joints in the armoured structures thus far inspected. "The difficulty of securing structures to the hard face, in default of knowledge as to the exact location of the fastenings, is also in course of solution. It was found feasible to tap and drill holes in the face of the plate at any stage of the process prior to hardening, without detracting from the plate's resistance; but as it was impossible to locate these holes with precision without fitting the armour into place, this method was abandoned in favour of one by which the carbon was prevented from penetrating over certain areas in the wake of the fastenings. This method had also its disadvantages, in that the carbon gases frequently seeped through the protecting material and carbonised the surface beneath. The most satisfactory method, and one which will probably be employed in the future, is that of electrically annealing the surface to be drilled." It is curious to observe that for the moment the makers in the United States and England are moving in opposite directions in more than one respect. We say in England nickel-treated plates cannot be acted on by the arc drill, and those plates which have no nickel in them are, after all, best dealt with by drilling holes before face hardening, and although on one occasion Brown's firm have submitted a plate with a soft margin to take drilled holes, it was rather regarded as a possible than likely expedient.* In the United States, on the other hand, soft places or holes drilled before hardening have been superseded by the electric arc drill with nickel-Harveyed plates, which we consider do not admit of its application. Further experience must modify such sharp contradictions.

Captain Sampson considers that the greatest objection to face hardening, and the one likely to continue, is cost. Repeated machinery and other operations can hardly be dispensed with, which must involve expense. As to nickel, Captain Sampson speaks strongly in its favour. It enables armour to be made "far stronger and more resisting," and at the same time tougher also. When its working has been mastered, its use diminishes risk of failure, because it is less susceptible to injury in working, though very susceptible to

* Messrs. Brown sent a treated plate to Ochta which had an untreated margin, but this is hardly likely to be repeated, though clearly a possible achievement.

treatment. Hence the decreased percentage of failures will go far to wipe out the increased cost of machinery. "Nickel also appears to render the carbon more sensitive to hardening, and hence water-hardened Harvey plates of nickel steel are toughened at depths hardly affected in simple steel plates." The difficulties mentioned by Mr. Ellis do not appear to have been experienced in the United States. In short, the question now is, whether the present percentage of nickel, 3·25, cannot be increased. Captain Sampson states that the Witkowitz unhardened plate, which won the remarkable victory at Pola over treated competitors, contained 5 per cent. of nickel. Even in England, says the author, nickel steel is employed for unbacked structures. A word or two is called for here. Horizontal armour has been made of nickel steel in England, but it has been rejected for side armour. Nevertheless it may be hoped that all thought of nickel has not been given up, seeing that for shields which are exposed to an attack which is formidable from its long continuance, and not from the crushing force of a single blow, nickel steel is the best possible material, speaking from present knowledge. An inland cupola or shield, for example, would be exposed to the long-continued breaching attack of siege guns of moderate power. It would be easy generally to supply an untreated nickel shield, capable of resisting a single blow, and such a shield would bear continued attack indefinitely long. It would, in fact, behave like a very superior kind of wrought iron. Further, without questioning the wisdom of supplying for our ships building at the moment the shields which we find best—namely, treated steel without nickel—it may be hoped that nickel is not to be lost sight of, even for ships, as still possibly desirable. In battle-ships with thick armour the contingency of an overpowering blow becomes of less, and that of repeated blows of more, importance.

Captain Sampson sums up the firms who have adopted the Harvey process as follows :—In England, Cammel, Brown, and Vickers; in France, St. Chamond, Chatillon-Commentry, Marrel Frères, and St. Etienne, and Messrs. Schneider; also Krupp, Dillinger, and Witkowitz, although the five last-named had face-hardening processes of their own. Although the author considers that it is wild work to estimate the amount of increased resisting power due to Harvey's process, the French and the English authorities agree in giving from 1·8 to 1·87 inches of wrought iron as the equivalent of each inch of Harveyed steel. Probably the case, when the same relation in America worked out as 2·14, is exceptional. The fact, however, is that any thoughtful man would, like Captain Sampson, refuse to be drawn into an exact estimate, seeing that the resistance of treated plates depends on their power to fracture the shot.

Jaques on armour

Captain Jaques has brought out a valuable review of the experiments made on armour since the introduction of nickel and of the Harvey and other modes of treatment. It is admirably illustrated, and contains photographs and cuts not found elsewhere, among others a cut of a plate of Hadfield manganese steel tried in America, and of a nickel steel plate attacked by Johnson's cast-steel shot. In concluding, Captain Jaques dwells on the fact that trials in England are nearly all confined to thin plates, and that for thick armour we must consult records of U.S. trials.

On May 11th, at Indian Head, a 6-inch steel plate, made by

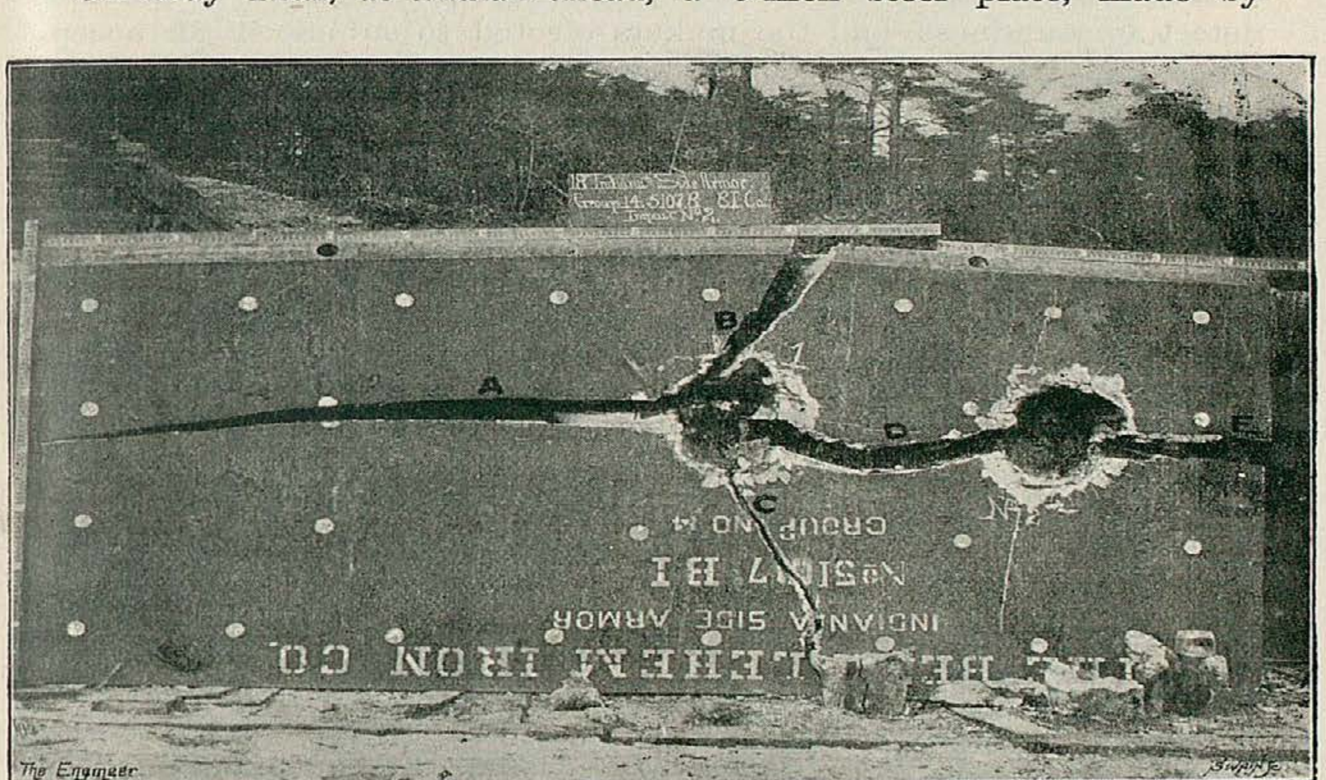


Fig. 1.

Armour experiments. Carnegie plates with face cracks.

Carnegie, which had been rejected on account of a profusion of face-cracks, was tested by the attack of 6-inch projectiles, fired with varying velocities, and is said to have acquitted itself even better than any of the plates which had been passed. On June 23rd 13-inch Carpenter and Wheeler projectiles perforated 13-inch untreated nickel steel plates easily.

Thick Harveyed nickel steel armour.

The best data as to the success of the Harvey process as applied to thick nickel-steel armour are furnished by the following experiments :—

On May 19th last a plate for the Indiana, made by Bethlehem, measuring 15½ ft. by 7½ ft. by 18 in., tapering to 8 in. at the bottom

edge, was attacked by 12-in. Carpenter forged steel shot weighing 850 lbs. The first round, striking with 1465 ft.-secs. velocity, broke the plate across in lines B C (Fig. 1) and horizontally along A. A second round was delivered on the portion to the right, completing the horizontal fracture line A D E; the striking velocity of this shot being 1926 ft.-secs.

The first round, which penetrated about 20 in., was a disappointing one for the plate-makers. The calculated perforation is only 18·7 in. of wrought iron or 15 in. of steel. The plate had made a loud noise during the process of manufacture, but subsequent tests had failed to detect unsoundness, and the makers elected to submit it for acceptance and trial. The second blow, falling as it did on a portion constituting not more than two-fifths of the mass, delivered a shock of about 1681 ft.-tons per ton of plate, and fracture was to be expected even under more favourable circumstances. This result is no test of sound thick Harveyed armour, because a large horizontal crack was found to have been developed in the process of water hardening: but inasmuch as the makers, failing to detect a flaw, decided to submit the plate for acceptance, it may be fairly argued that plates containing flaws may find their way into the Service, and consequently that unsound plates may be found among the sound ones, unless the processes of manufacture are more strictly watched.

Another thick armour-plate of Harveyed nickel steel made by the Bethlehem Company was tested at Indian Head on June 12th last with complete success (see Fig. 2). The plate was a curved one for the barbette of the Massachusetts. It measures 12 ft. 1 in. by 8 ft. 4¼ in. by 17 in., and its weight is 30 tons 5¾ cwt. It was attacked, like the plate preceding it, by 12-in. Carpenter forged steel projectiles weighing 850 lbs. each. The first round had a striking velocity of 1410 ft., implying an energy of about 11,715 ft.-tons, and a perforation through iron of 17·96 in., and through steel of 14·37 in. A second round had a striking velocity of 1853 ft.-secs., and an energy of about 20,240 ft.-tons, implying a perforation of 24·23 in. of iron and 19·38 in. of steel. The first projectile broke up with a penetration of about 8 in., and the second broke up with about 11 in. penetration. There was a fine horizontal crack in the plate running from the right side of the second point of impact. The plate was approved, and twenty-six 17-in. plates were accepted on its success. The performance is greatly to be commended. The second blow, it may be seen, represents more than 2 in. perforation than the plate attacked, and the shock is 663 ft.-tons per ton of plate, the latter being fully as severe as that to which the 18-in. plate had been subjected.

On July 12th, at Indian Head, a Carnegie 17-in. Harveyed nickel steel plate was tested. The account gives figures clearly incorrect in some instances, but is probably substantially true. A Carpenter 850 lb. 12-in. shot with 1410 ft.-secs. muzzle velocity is said to have penetrated 13·5 in. into the plate and rebounded intact, and a Wheeler Sterling shell of 850 lbs. weight with 1858 ft.-secs. muzzle velocity completely perforated the plate and backing, and passed on.



Fig. 2.

On July 20th, at Indian Head, a Bethlehem 18-in. Harveyed nickel steel plate was attacked by a Carpenter 850 lb. 12-in. shot with a velocity of 1465 ft.-secs., which broke up with a penetration of 8 in. A second Carpenter shot, with 1926 ft.-secs. velocity, broke up with a penetration of only 9 in. On the behaviour of this plate 660 tons of armour was accepted.

Russian experiments with capped shot.

At Ochta, St. Petersburg, on June 28th last, two Harvey-Tresidder plates, 8 ft. by 8 ft. by 6 in., furnished by Brown and Cammel, and one 8 ft. by 8 ft. by 10 in., furnished by Brown, were attacked by 6-in. projectiles from an Oboukhoff gun 45-calibres long. The striking velocity for the 6-in. plate was about 1850 ft.-sec., and for the 10-in. 2400 ft.-sec. Owing to the curve of the plate, the angle of impact was from 8 to 10 degrees from the normal or direct line. Projectiles made at the Putilof Works on Holtzer's system broke up against these plates, except such as were termed the "secret process" or "magnetic" shot, which perforated the plates direct, and in one case striking at about 25 deg. to the normal, though oblique impact failed against the Cammel plate.

These "secret process"* Russian shot were referred to in last year's *Annual* as perhaps differing from the capped shot already tried in Russia and also many years ago at Shoeburyness. It seems now to be clearly established that the word "magnetic," which has been applied to them, is only a "blind," and that capped shot are employed, though perhaps differing from those formerly in use in some respects. This has not been acknowledged by the Russian authorities, but the following circumstances place it beyond a doubt: (1) The concealment of the projectiles from view argues the application of some visible device; (2) screens were employed, apparently to catch something which might become detached from the shot; (3) it was stated that the process was applied to Holtzer projectiles, which point to a mechanical process of some kind rather than a metallurgical one; (4) the capped shot, which had proved remarkably successful, suddenly disappeared, their place being taken by these secret process shot; (5) the secret process projectiles behaved no better than other Holtzer shot when fired at untreated plates, such as did not break up the ordinary Holtzer shot; this points to a device for preventing fracture; (6) an object was seen in the hand of a Russian official on the practice ground for an instant, which looked like a shot cap; (7) a strip of apparently soft steel or iron was observed exuding from the edge of a shot head which was lodged in a plate; (8) capped shot since tried in England have behaved in the same way as these Russian "secret process" shot. It was at first thought that magnetism might have been employed to hold the cap on to the point of the shot, but even this is not likely, for the ogival head does not lend itself to the application of magnetism. It may, however, have been tried and thus suggested the name.

Supposing the Russian shot to weigh 90·9 lbs., Krupp's formula

* *Naval Annual*, 1894, p. 365.

gives for the above velocities perforations of 13·8 in. of iron or 10·3 in. of steel against the 6-in. plates, and 17·1 in. of iron or 13·7 in. of steel against the 10-in. plate. Thus if the projectile were preserved from fracture against the plate-face, perforation ought to follow. The following tables show what took place:—

FIRED AT BROWN'S 6-INCH TREATED PLATE.

Nature of projectile.	Striking Velocity.	Angle of impact with normal.	Action of Shot on Plate.
	ft.-secs.		
Holtzer	1870	within 10° of the direct line	Shot broken up.
Secret process (Capped) . .	1843	do.	Through.
" " . .	....	15°	Through.
Holtzer	....	15°	Shot broken up, 5 or 6 cracks formed.
Secret process (Capped) . .	....	20°	Through.
" " . .	....	25°	Through, but broken up.

FIRED AT CAMMEL'S 6-INCH TREATED PLATE.

Nature of projectile.	Striking Velocity.	Angle of impact with normal.	Action of Shot on Plate.
	ft.-secs.		
Holtzer	1856	within 10° of the direct line	Shot broken up.
Secret process (Capped) . .	1840	do.	Through.
" " . .	....	25°	Shot pulverised.
Holtzer	....	25°	Shot pulverised.
Secret process (Capped) . .	....	25°	Shot pulverised.
" " . .	....	20°	Shot broken up, penetration 2·3 in.
" " . .	...	15°	Through, plate broken.

FIRED AT BROWN'S 10-INCH TREATED PLATE.

Nature of projectile.	Striking Velocity.	Angle of impact with normal.	Action of Shot on Plate.
	ft.-secs.		
Secret process (Capped) . .	....	8°	Through.
Holtzer	2375	10°	Shot pulverised.
Secret process (Capped) . .	....	nearly direct	Penetrated 15½ in. from face.
Holtzer	2211	do.	Shot broken, penetration 8 to 9 in.
Secret process (Capped) . .	2390	8°	Through.
Holtzer	2390	10°	Shot broken up.
"	....	nearly direct	Shot pulverised.

The cap, it may be seen, did not in every instance save the shot from eventual fracture, but the penetration was greatly increased, even when the shot broke. It enabled the shot to retain its point

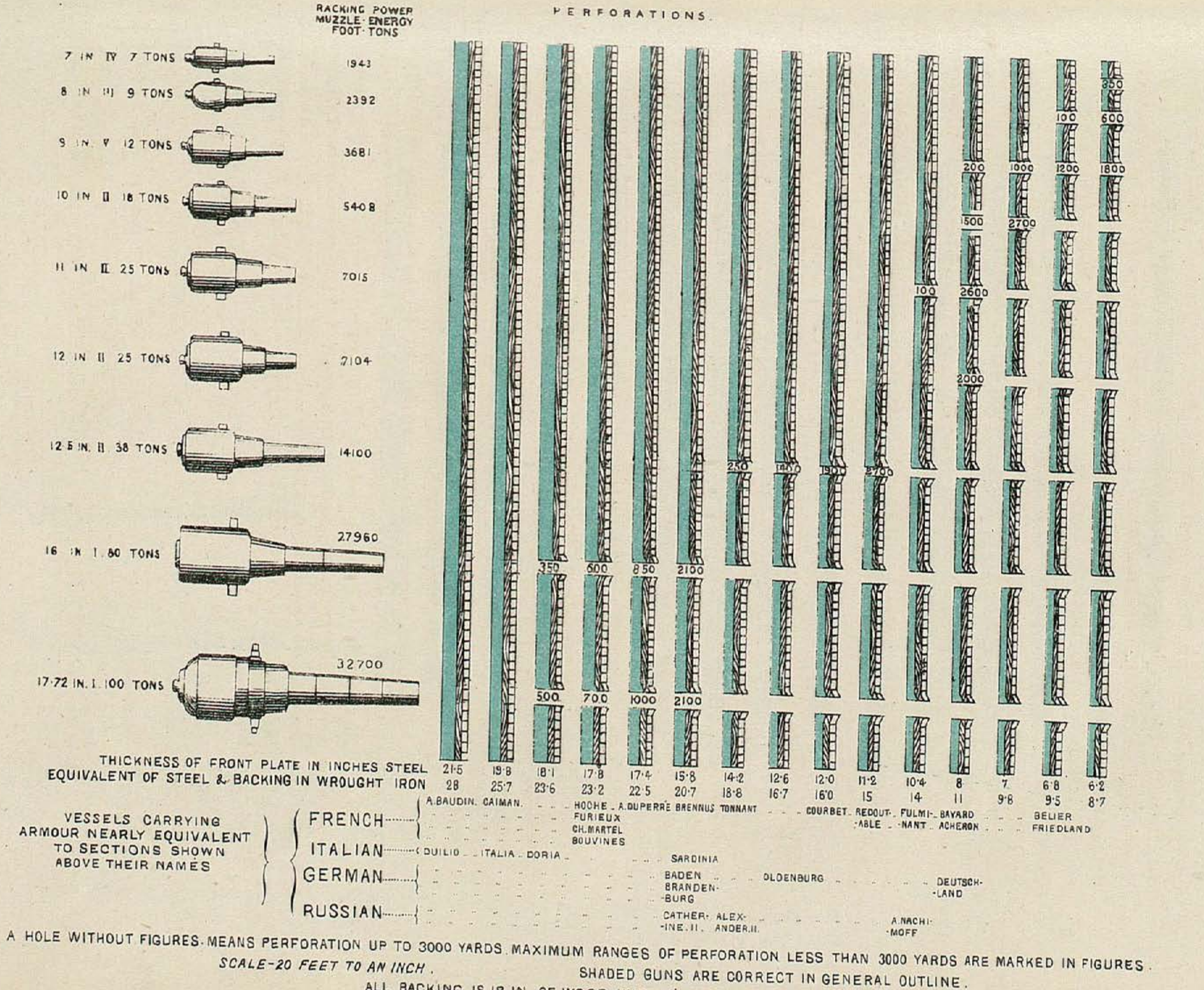
and escape all fracture, and to perforate treated plates under conditions when uncapped shot were totally defeated. Success was thus obtained when the angle of impact did not deviate over 20° from the normal, a range of angles which is abundantly sufficient to be of value under actual service conditions. The difficulty of attaching the cap has been overcome and may be met in more than one way.

Hadfield's special shot.

It may here be noticed that other attempts have been made with varying degrees of success to prevent the shot from being fractured by the skin of the treated plate. In August last Messrs. Hadfield obtained considerable success with blunt-pointed projectiles, which penetrated treated plates which defeated the ordinary Holtzer shot. The projectiles were, however, broken.

Alteration in the Plates Showing Perforation of Armour.

Note.—At present it does not appear possible to deal satisfactorily with the question of perforation. There is reason to believe that the English formulæ give results which are grossly wrong at the high velocities which have now come in for certain guns, for example the 12-in. wire gun and indeed the small wire guns. Krupp's formula has therefore been used for velocities of 2000 ft.-secs. and over, a note being made to that effect in the tables. All formulæ nearly agree at 1580 ft.-secs., above which the English formulæ give results falling short of those of de Marre and Krupp by increasing differences. Injustice is therefore probably done to the powers of projectiles with velocities above 1580 to an extent which becomes distinctly objectionable when 2000 is nearly reached. In theory the best solution would be to use Krupp's formula for all velocities over 1580, but this would cause a large number of figures in the tables to differ from those issued by authority for the sake of small and uncertain corrections. On the whole, it is thought best to defer such a systematic change until it can be made on better established data than are at present available, very few experiments on perforation at high velocities having yet been made. See *Naval Annual* for 1893, p. 313.


BRITISH M.L GUNS.
PERFORATIONS.
RACKING POWER MUZZLE ENERGY FOOT TONS
7 IN IV 7 TONS 1943
8 IN III 9 TONS 2392
9 IN V 12 TONS 3681
10 IN II 18 TONS 5408
11 IN II 25 TONS 7015
12 IN II 25 TONS 7104
12.5 IN. II 38 TONS 14100
16 IN I 80 TONS 27960
17·72 IN. I. 100 TONS 32700
350 600 850 2100 250 1400 1900 2700 100 200 1500 2600 2000 1000 2700 100 1200 350 600 1800
500 700 1000 2100
THICKNESS OF FRONT PLATE IN INCHES STEEL 21·5 19·8 18·1 17·8 17·4 15·8 14·2 12·6 12·0 11·2 10·4 8 7 6·8 6·2
EQUIVALENT OF STEEL & BACKING IN WROUGHT IRON 28 25·7 23·6 23·2 22·5 20·7 18·8 16·7 16·0 15 14 11 9·8 9·5 8·7
VESSELS CARRYING ARMOUR NEARLY EQUIVALENT TO SECTIONS SHOWN ABOVE THEIR NAMES
FRENCH A.BAUDIN. CAIMAN. HOCHE. FURIEUX CH.MARTEL BOUVINES A.DUPERRÉ BRENNUS TONNANT COURBET. REDOUT-ABLE. FULMI-NANT. BAYARD ACHERON BELIER FRIEDLAND
ITALIAN DUILIO ITALIA. DORIA SARDINIA
GERMAN BADEN BRANDEN-BURG OLDENBURG DEUTSCH-LAND
RUSSIAN CATHER-INE.II. ALEX-ANDER.II. A.NACHI-MOFF
A HOLE WITHOUT FIGURES. MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES.
SCALE-20 FEET TO AN INCH.
SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.
ALL BACKING IS 18 IN. OF WOOD WITH 1½ IN SKIN.
NOTE THE 29 TON 10 IN. GUN PERFORATES THE 18·8 IN IRON (TONNANT) SHIELD AT 1800 YDS. & ALL THINNER SHIELDS AT ALL RANGES.
† THIS GUN IS TAKEN FROM ELSWICK Q.F. GUN TABLE.

BRITISH B.L. GUNS.

PERFORATION.

Gun	Racking-Power. Muzzle Energy Foot-Tons
† Q.F. 6 IN. VI 6·6 TONS	4333
8 IN. IV 15 TONS	6730
9·2 IN. VI 22 TONS	10920
12 IN. VII 45 TONS	18130
13·5 IN. 67 TONS	35230
16·25 IN. 111 TONS	54390

The 12-IN-VIII-WIRE has still greater perforation.

Ranges of perforation marked in figures:
6 IN.: 165, 560, 850, 1120, 1415, 2500, 2995
8 IN.: 500, 950, 1400
9·2 IN.: 700, 1900, 2350
12 IN.: 950, 2000
13·5 IN.: 1100, 2350

THICKNESS OF FRONT PLATE IN INCHES STEEL	21·5	19·8	18·1	17·8	17·4	15·8	14·2	12·6	12·0	11·2	10·4	8	7	6·8	6·2
EQUIVALENT OF STEEL & BACKING IN WROUGHT IRON	28	25·7	23·6	23·2	22·5	20·7	18·8	16·7	16·0	15	14	11	9·8	9·5	8·7

VESSELS CARRYING ARMOUR NEARLY EQUIVALENT TO SECTIONS SHOWN ABOVE THEIR NAMES

FRENCH: A. BAUDIN. CAIMAN. HOCHE. FURIEUX. CH. MARTEL. BOUVINES. A. DUPERRÉ. BRENNUS. TONNANT. COURBET. REDOUTABLE. FULMINANT. BAYARD. ACHERON. BELIER. FRIEDLAND.

ITALIAN: DUILIO. ITALIA. DORIA. SARDINIA.

GERMAN: BADEN. BRANDENBURG. OLDENBURG. DEUTSCHLAND.

RUSSIAN: CATHERINE II. ALEXANDER II. A. NACHIMOFF.

A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES.

SCALE-20 FEET TO AN INCH.

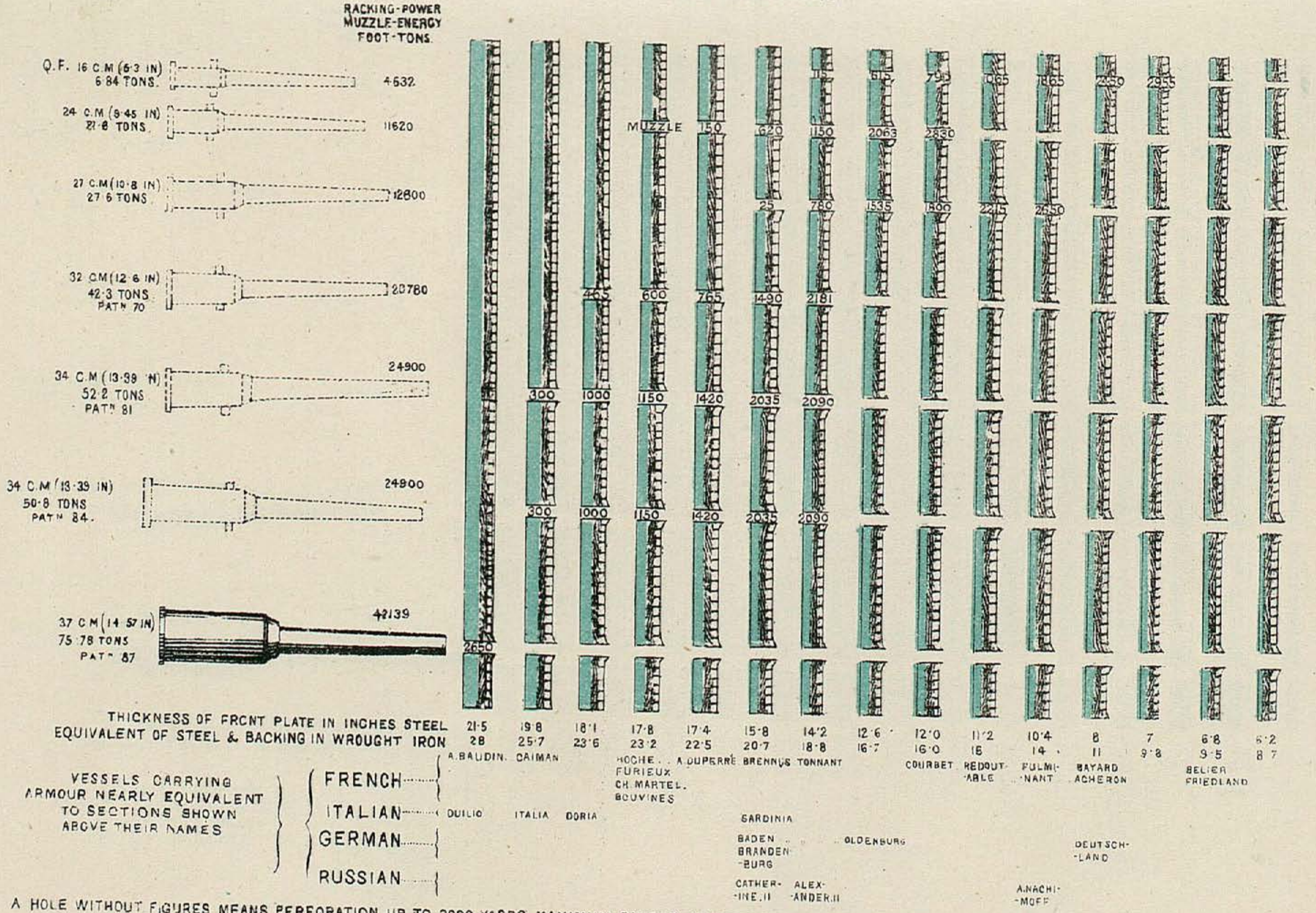
SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.

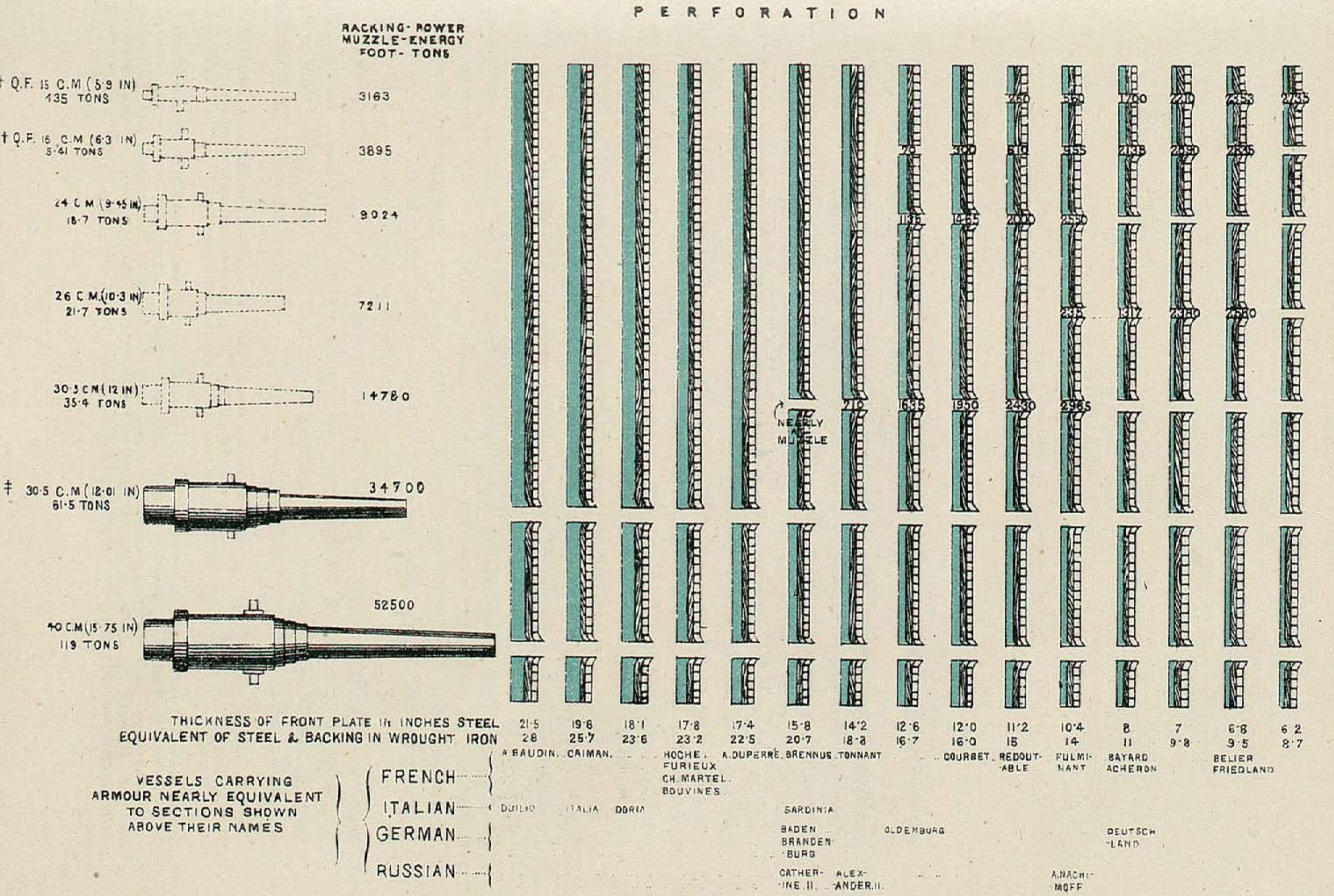
ALL BACKING IS 18 IN. OF WOOD WITH 1½ IN. SKIN.

NOTE THE 29 TON 10 IN. GUN PERFORATES THE 18·8 IN IRON (TONNANT) SHIELD AT 1800 YDS. & ALL THINNER SHIELDS AT ALL RANGES.

† THIS GUN IS TAKEN FROM ELSWICK Q.F. GUN TABLE.

FRENCH GUNS.


PERFORATIONS.
RACKING-POWER MUZZLE-ENERGY FOOT-TONS.
Q.F. 16 C.M (6·3 IN) 6·84 TONS. 4632
24 C.M (9·45 IN) 21·8 TONS. 11620
27 C.M (10·8 IN) 27·6 TONS. 12800
32 C.M (12·6 IN) 42·3 TONS PATN 70 20780
34 C.M (13·39 IN) 52·2 TONS PATN 81 24900
34 C.M (13·39 IN) 50·8 TONS PATN 84. 24900
37 C.M (14·57 IN) 75·78 TONS PATN 87 42139
MUZZLE
THICKNESS OF FRONT PLATE IN INCHES STEEL
EQUIVALENT OF STEEL & BACKING IN WROUGHT IRON
21·5 28 | 19·8 25·7 | 18·1 23·6 | 17·8 23·2 | 17·4 22·5 | 15·8 20·7 | 14·2 18·8 | 12·6 16·7 | 12·0 16·0 | 11·2 15 | 10·4 14 | 8 11 | 7 9·8 | 6·8 9·5 | 6·2 8·7
VESSELS CARRYING ARMOUR NEARLY EQUIVALENT TO SECTIONS SHOWN ABOVE THEIR NAMES
FRENCH: A. BAUDIN. CAIMAN. HOCHE. FURIEUX. CH. MARTEL. BOUVINES. A. DUPERRÉ. BRENNUS. TONNANT. COURBET. REDOUTABLE. FULMINANT. BAYARD. ACHERON. BELIER. FRIEDLAND.
ITALIAN: DUILIO. ITALIA. DORIA. SARDINIA.
GERMAN: BADEN. BRANDENBURG. OLDENBURG. DEUTSCHLAND.
RUSSIAN: CATHERINE II. ALEXANDER II. A. NACHIMOFF.
A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES
SCALE-20 FEET TO AN INCH.
SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.
ALL BACKING 18 18 IN. OF WOOD WITH 1½ IN SKIN.


GERMAN GUNS
PERFORATION
RACKING-POWER MUZZLE-ENERGY FOOT-TONS
† Q.F. 15 C.M (5·9 IN) 4·35 TONS
3163
† Q.F. 16 C.M (6·3 IN) 5·41 TONS
3895
24 C.M (9·45 IN) 18·7 TONS
9024
26 C.M (10·3 IN) 21·7 TONS
7211
30·5 C.M (12 IN) 35·4 TONS
14780
‡ 30·5 C.M (12·01 IN) 61·5 TONS
34700
40 C.M (15·75 IN) 119 TONS
52500
NEARLY AT MUZZLE
THICKNESS OF FRONT PLATE IN INCHES STEEL
EQUIVALENT OF STEEL & BACKING IN WROUGHT IRON
21·5 28
19·8 25·7
18·1 23·6
17·8 23·2
17·4 22·5
15·8 20·7
14·2 18·8
12·6 16·7
12·0 16·0
11·2 15
10·4 14
8 11
7 9·8
6·8 9·5
6·2 8·7
VESSELS CARRYING ARMOUR NEARLY EQUIVALENT TO SECTIONS SHOWN ABOVE THEIR NAMES
FRENCH
ITALIAN
GERMAN
RUSSIAN
A. BAUDIN. CAIMAN. HOCHE. FURIEUX CH. MARTEL. BOUVINES. A. DUPERRÉ. BRENNUS. TONNANT COURBET. REDOUTABLE FULMINANT BAYARD ACHERON BELIER FRIEDLAND
DUILIO ITALIA DORIA SARDINIA
BADEN BRANDENBURG OLDENBURG DEUTSCHLAND
CATHERINE II. ALEXANDER II. A. NACHIMOFF
A HOLE WITHOUT FIGURES MEANS PERFORATION UP TO 3000 YARDS. MAXIMUM RANGES OF PERFORATION LESS THAN 3000 YARDS ARE MARKED IN FIGURES.
SCALE-20 FEET TO AN INCH.
SHADED GUNS ARE CORRECT IN GENERAL OUTLINE.
ALL BACKING IS 18 IN. OF WOOD WITH 1½ IN SKIN.
† TAKEN FROM KRUPP Q.F. GUN TABLE.
‡ TAKEN FROM KRUPP ORDNANCE AT CHICAGO.

II.

Ordnance.

The following are the principal directions in which improvement is being effected in British ordnance :—

Wire guns. Wire guns, which are a specially English conception, having been proposed by Longridge a generation ago, have now proved so completely successful that they have been made in increasing numbers at Elswick, while in the Royal Arsenal all new guns demanded have for some time past been made on the wire system of construction,* which is now adopted for heavy ordnance as well as for certain quick-fire guns. Wire guns firing cordite charges have possibilities before them far beyond what has yet been exhibited in connection with service ordnance. For example, the new Elswick 8-in. quick-fire gun gives a working velocity of 2660 ft.-secs. with a 210 lb. shell, and 2500 with a 250 lb. armour-piercing projectile.

The wire † in these guns is wound on to an outer and inner "A" tube from 1 in. to 1·2 inches thick, specially designed with a view to cutting out and replacing by a "liner" ‡ when worn by erosion. The wire is held at the end of each coil by a band, and the whole is covered by a steel jacket, which protects it and contributes longitudinal strength to the piece. The 12-in. wire gun fires a charge of 167½ lbs. of cordite, made up in quarter charges. The erosion is even, but is sufficiently great to be serious.

Rapid fire. The power of our armaments to deliver fire rapidly has been increased, both by the issue of quick-fire guns in increasing numbers, and also by the application of devices facilitating the service of heavier pieces. Thus a satisfactory system of conversion

* Howitzers for high-angle fire may form an exception.
† Sometimes called ribbon from its rectangular section.
‡ The "liner" has a mechanical fit ; it is not gripped by shrinkage.

Authorities.—The *Engineer* for plates and matter; information obtained at the Royal Arsenal and from Elswick; Canet, Krupp, Captain Cowles, United States Naval Attaché; the Report of Chief of United States Bureau; United Service Institution Proceedings, information from abroad; Proceedings and notes of United Service Institution; Victor Horseley; the *Times* and *Engineering*; also direct correspondence with makers.

of the 6-in. guns formerly issued to quick-fire pieces has been designed and adopted. With the more modern (pedestal) mountings the sights can be fixed on the cradle so as to, as far as possible, prevent laying being interfered with by the recoil. In the case of earlier patterns of carriages for broadside pieces, it may be necessary either to sacrifice this advantage or to make new mountings. It should, however, be borne in mind that the advantage here referred to is not generally found, either in connection with the converted quick-fire pieces or even in the earlier foreign quick-fire mountings proper; for instance, very few quick-fire guns exhibited in Chicago possessed it.

An Elswick design for utilising the recoil of heavy ordnance to open the breech has been approved and introduced for some guns; by this much time and labour is saved. Electric firing gear has been improved by getting rid of lengths of tube wires, formerly so far exposed as to be liable to cause failures. In the Royal Carriage Department has been designed an application of ball bearings to the nave of a field-gun wheel, so as to reduce the draught as far as possible. It is curious to note how the increased power of the modern field-piece, which seems to bring reduction in the weight of carriage, has called out on the one hand strenuous and persistent efforts to stop the wheels in the best and most complete way by means of efficient brakes at the moment of firing, and, on the other hand, to make them rotate as easily as possible in transit. The wheel which will turn most easily, and at the same time is checked most perfectly in recoil, enables the most powerful gun to be used in the field.

Ball bearings.

It will be seen that ball bearings have come in more extensively in Elswick quick-fire mountings. In this respect, however, Krupp appears to have been before us, this having been the common feature in the mountings exhibited by him at Chicago; and the newest pattern of pedestal mounting further resembles those of Krupp in being altogether controlled instead of being intended to be swung round by hand and shoulder when desired. The movement is effected by a worm wheel. Krupp's lighter quick-fire pieces have provision made for free movement when desired, like our own. At a fixed target, Krupp states that a 7·5 cm. (2·25-in.) gun fired seventeen rounds accurately in a minute, while eight only could have been equally well delivered from the shoulder support.

Ordnance used in the battle of Yalu.

The following circumstances have been gathered with regard to the ordnance taking part in the battle of Yalu.

The Chinese armaments had been greatly neglected in other matters besides their quick-fire armament; for example, the supply of

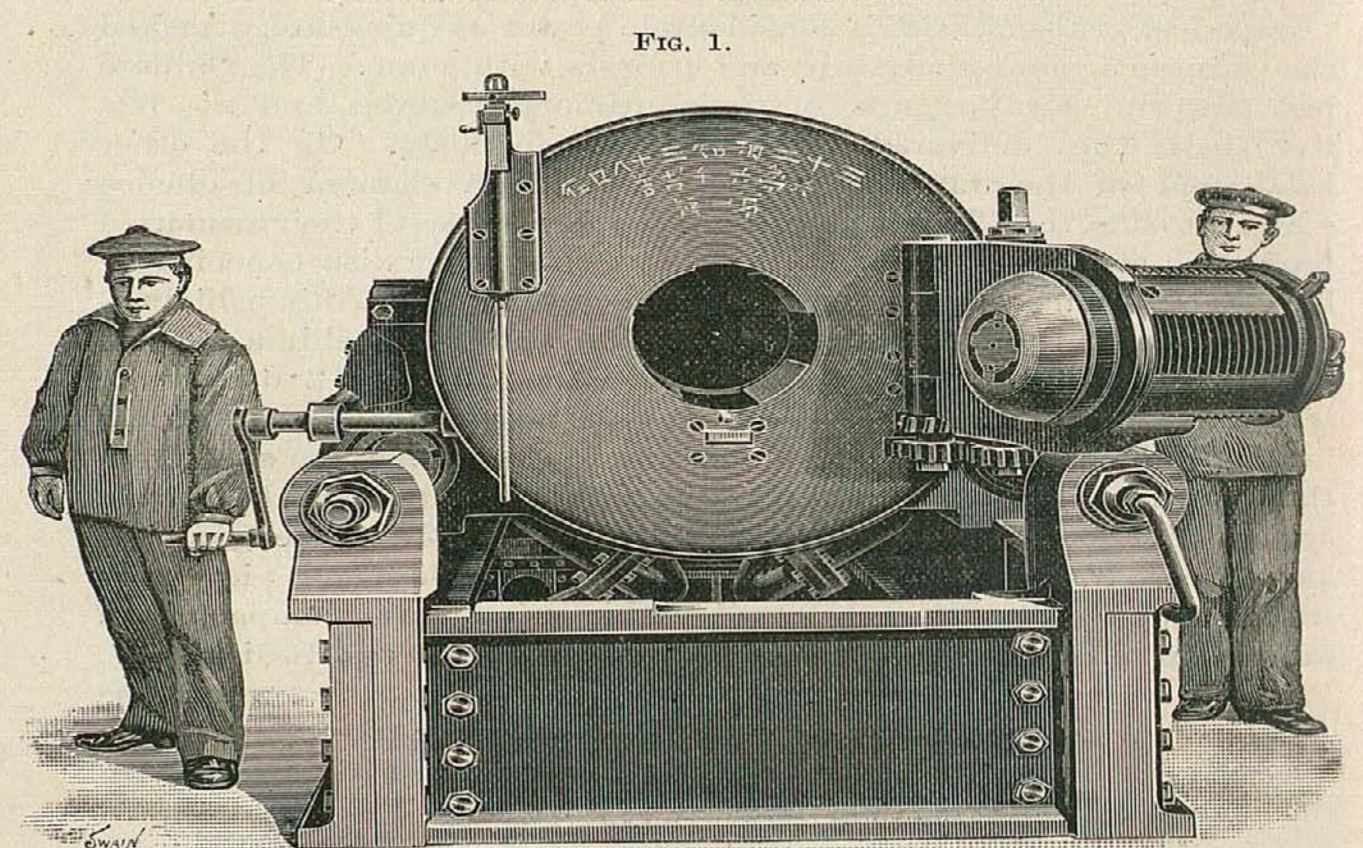
ammunition to their heavy guns was disgraceful. Some pieces must have run out of common shell after a very few rounds, or perhaps even had none, and consequently had to employ armour-piercing projectiles, which, against the Japanese cruisers, were no better than cast-iron shot or blind shell. Then as to quick-fire, the utmost that can have been done is the shipment of a few light quick-fire guns on board at the last, and it seems probable that on the Chinese side there was practically no quick-fire. The Japanese, on the other hand, had quick-fire pieces all supplied from Elswick.

Japanese cruisers, with a considerable power of quick-fire, attacked the Chinese armour-clad ships and cruisers with none. The Chinese had powerful Krupp guns in their primary batteries, and the few live shells they delivered home told tremendously. On the other hand, four of the Japanese ships possessed an element of offence which forbade the Chinese from availing themselves of their armoured protection and heavy ordnance, as they might otherwise conceivably have done—namely, a long gun of great power. The Akitsushima—cruiser — and the Hasidate, Itsukusima, and Matsushima — coast defence ships—each possessed one long Canet 32 cm. (12·6-in.) gun, which, excepting the British 110½-ton and the Italian 105-ton breech-loading guns, is the most formidable gun afloat, as may be seen from the following figures. The perforations through iron on the Krupp system of calculation of the British, Italian, and Japanese guns are respectively 37·4-in., 35·8-in., and 38·3-in. The Japanese piece here stands actually first, though possibly this arises from comparing an experimental round with service rounds of the British and Italian guns. Probably as fired for service, these three guns ought to be regarded as equal in power of perforation. In energy, the larger pieces manifestly have the advantage, the British, Italian, and Japanese projectiles with the above velocities having respectively 54,390, 55,030 and 39,770 foot-tons energy; the British gun being no doubt fired with a relatively smaller charge than the Italian, seeing that it is a more powerful gun constructed by the same makers. Another very important matter, as concerns ships, is the bursting charge, which naturally is much greater in the British and Italian shells than in the Japanese. On the whole, then, the Japanese gun must be classed after the other two in destructive effect. This in no way militates against the fact that it is an extraordinary weapon; so much so as to be disproportionate to the requirements of war on the Chinese seas. A very much lighter gun might have been quite capable of riddling any armour likely to be afloat in those waters for many years to come, and at the same time it would be much more quickly and easily worked. Two lighter guns then might have replaced this long Canet piece with advantage.

The Japanese were so advised years ago, but they were bent upon these long powerful guns, and would have them, following in the wake of the armaments of the most powerful European ships, where the same mistake is made, though perhaps with more excuse, seeing that very heavy armour is found in European waters. If unnecessarily powerful, however, these long Canet guns were still of great value. Had the Japanese possessed nothing that could perforate the thick

CANET 32-CM. GUN IN JAPANESE FLEET.

FIG. 1.

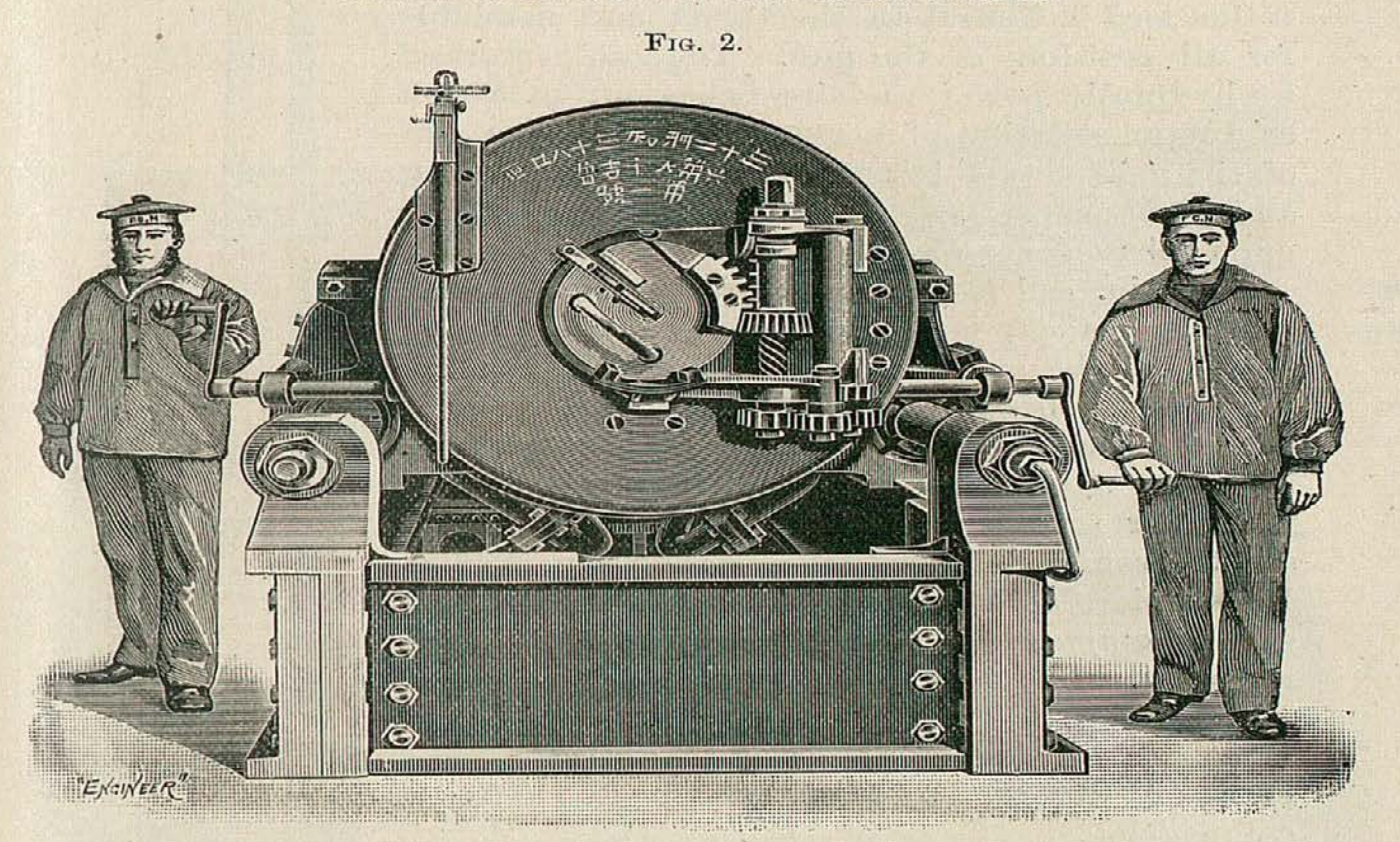


Chinese armour, we could conceive the Ting Yuen and Chen Yuen simulating disablement, dropping out from the rest of the fleet, and tempting the Japanese to close round and "finish" them until circumstances allowed the Chinese suddenly to open with their powerful guns and perhaps send their adversaries to the bottom, or destroy them at the same rate as the United States Merrimac disposed of her unarmoured adversaries. Such a move would be impossible if the Japanese were likely to riddle the Chinese ships or blow them to pieces when their long guns got close enough to deliver steel projectiles into their vital parts. Under the actual conditions of the battle, however, it was not likely that these long

guns would have justice done to their powers. Accounts differ as to their performance. One is said to have fired three times, sending its shell well home once. Another did better, a third was put *hors de combat* by a Chinese shell. One shell is reported as having penetrated through the side armour of a Chinese ship and then exploded, blowing open the armoured deck above and going far to destroy the ship. If this was the performance of a common shell, it was probably fired

CANET 32-CM. GUN IN JAPANESE FLEET.

FIG. 2.



into one of the thinner armoured vessels, and was an exhibition of nearly its maximum effects, for a common shell would break up even against medium armour without getting through it. The 12-in. compound plates of the Chinese barbette ships ought to keep all common shell out.

The figures and data following concerning the Canet guns were obtained from the makers. These were published in *Le Genie Civil* when the guns were new in 1891. **Long Canet guns at Yalu.**

The section shows the piece itself; Fig. 1, the breech open; Fig. 2, the breech closed; Fig. 3, the piece on its mounting. It will be seen that the gun is trunnionless. The mounting closely resembles that of the Elswick 110½-ton and 100-ton guns. The mounting

below and system of ammunition supply is different. Experiments showed that this piece was easily worked, and without question it is a magnificent weapon, as may be seen if its weight and power be taken into account. It has 612 foot-tons energy per ton of metal. Our own 67-ton gun has 526. Without here going into questions of construction or details of mounting, it can hardly fail to be noticed that the breech screw holds on to the inner tube, not the jacket, and that the ammunition feed is central in the turret and available for all positions of the gun. The gun is worked by hydraulic power, and its behaviour in action as a representative of a magnificent monster gun of the newest type is a matter of special interest, and as above said, so far as can be learned, the guns behaved very well.

CANET 32 C.M. (12·5 IN.) GUN OF 40 CALIBRES, WEIGHT 65 TONS

SECTION.

Elswick 8-in. quick-fire guns.

An 8-in. quick-fire gun designed at Elswick, starting loaded, has been fired at the rate of three rounds in 30 secs. (*i.e.* 15 secs. for the loading and firing of each of the two rounds), the time for the service 8-in. gun being about 1 min. 15 secs. A gun on board the Blanco Encalada fired four rounds in 62 secs. This was done at sea, the rounds being supplied from the magazine. In this piece, as before noticed, no metal cartridge-case is employed, a modified de Bange pad being relied on. The following description of the last pattern of 8-in. quick-fire Elswick gun displays a great advance, both in power and in speed and ease of working, and it may well challenge competition.

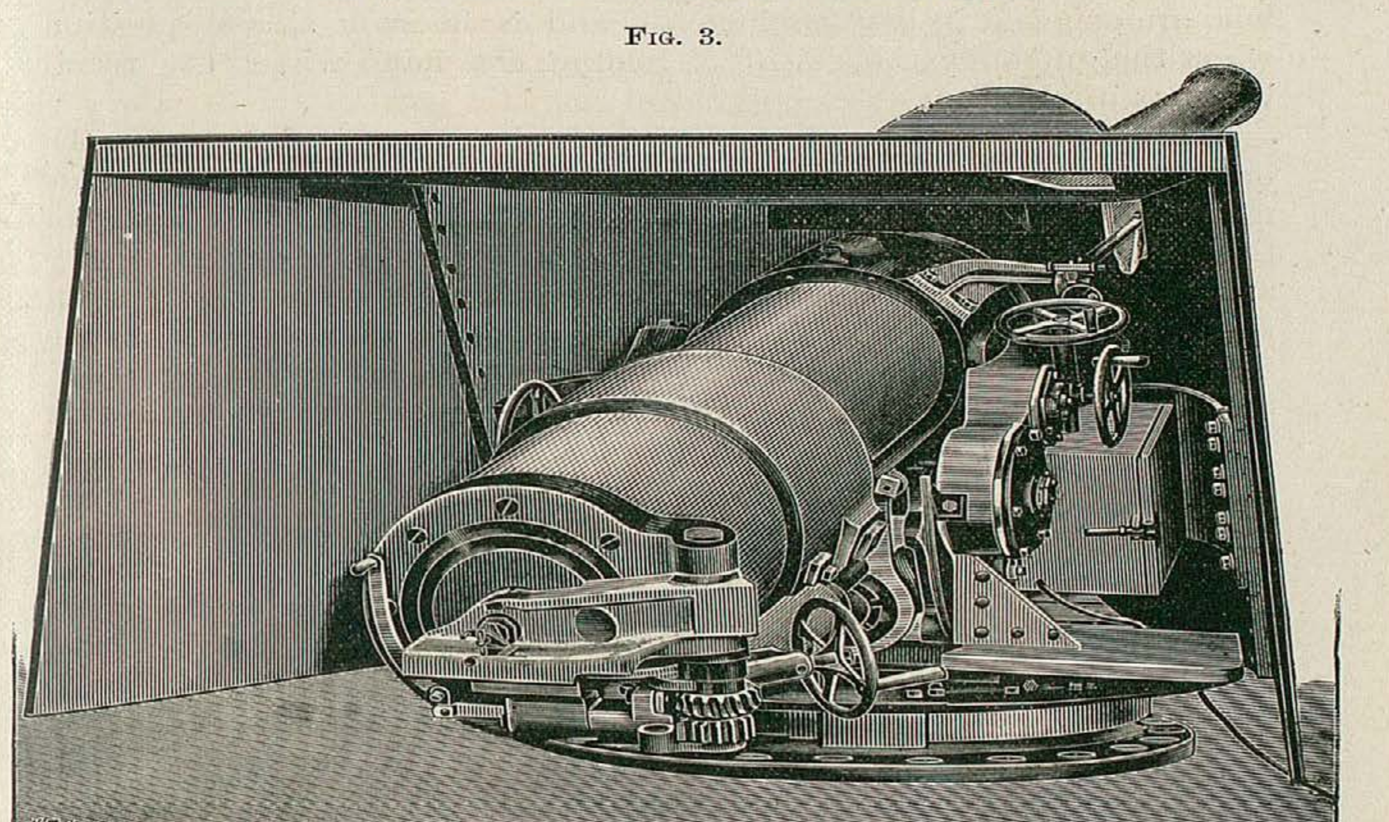
New Elswick wire quick-fire 8-in. gun.

This piece, which is shown in Figs. 4, 5, and 6, is of wire construction, and it is provided with automatic breech gear. The power is very great. It is fired with cordite charges, giving a working muzzle velocity of 2660 ft.-secs. to a projectile weighing 210 lb. In proof the projectile was fired with 2830 ft.-secs. muzzle velocity. For armour piercing a shot weighing 250 lb. is provided, which fired with a battering charge has 2670 ft.-secs., and with a full charge 2500 ft.-secs., the energies being 12,360 and 10,830 ft.-tons, and the perforations through iron 29·0 and 27·1-in. respectively.

The length of the gun is 45 calibres. The rifling is of the new Elswick pattern, and increases from breech to muzzle, the final twist being 1 turn in 33 calibres. The breech mechanism is specially designed for rapid loading, but cartridge cases are not employed, and the obturation is performed by a modified de Bange pad. The breech screw is "coned," being made in two diameters, with the largest diameter in rear, and the front portion is tapered. Owing to its form the breech plug may swing out directly the threads are

CANET 32-CM. GUN IN JAPANESE FLEET.

FIG. 3.



disengaged, thus dispensing with the withdrawal movement required with cylindrical plugs. The action is slightly modified, however, in this gun, as in order to withdraw the de Bange pad from its seat, it is necessary to move the screw a trifle directly to the rear. The motion is combined with that of swinging out in such manner that it appears as one movement.

The screw threads are interrupted in five places—see Fig. 5—and the interruptions on the rear portion are checkwise with those on the front or tapered portion. The breech screw, therefore, engages with the gun throughout its entire circumference. The breech plug

is borne on a gun-metal carrier, and a block sliding in the carrier carries a pin which engages in the rear face of the breech plug, and operates in such a manner that if the block is moved laterally it revolves the breech plug. A link attached to a small arm carried by a worm wheel, which revolves on the carrier axis pin, is the means used to give lateral motion to the sliding block. The worm, gearing into the worm wheel, is carried by a shaft fitted with a hand wheel. The shaft is on the right of the gun—see Figs. 5 and 6—and the hand wheel is at a convenient distance in front of the breech-screw. The man who opens the breech is entirely clear of the men who are engaged in loading the gun, and is in such a safe position when the gun fires, that even if holding the hand wheel, the recoil will not injure him.

Ten continuous turns of the hand wheel are required to open the breech, and this can readily be done in 3·5 seconds. The reverse motions for closing the breech occupy an equally short interval of time. In addition to the hand gear, the breech can be worked by automatic gear. If this is in action, the breech opens whilst the gun is running out, and after loading it is only necessary to pull a line for it to close again. The change from hand to automatic gear can be effected in about five seconds. Missfires sometimes occur with large guns when the primer is at the rear end of the breech plug and the vent is very long. To obviate this the primer is attached to a "primer holder," and is inserted about a foot into the breech plug, leaving only about 10-in. of vent between the primer and the charge.

The primer holder provides for either percussion or electric firing, and is so arranged that it can be easily inserted or withdrawn, and the gun cannot be fired unless the primer holder is properly placed. It consists of a steel needle inclosed by a tube of insulating material; outside of this is a steel tube, which in turn is surrounded by a strong spiral spring, which either keeps the striker in contact with the electric tube or serves to drive it against the percussion tube. The entire arrangement is contained in a steel case fitted in front with a short quick-motion screw, on which the cap containing the primer, either percussion or electric, is screwed, and is centred immediately in front of the striker. The striker cannot be brought in contact with the primer during the operation of putting the latter in place, as the primer holder cannot be withdrawn from the gun unless the striker is drawn back and locked well clear of the primer.

Attached to a carrier is a trigger which may be put in gear for percussion firing or thrown out of gear when electric firing is used. If in the former position it is only necessary to draw the primer holder to the rear to enable it to engage with the trigger, or if the

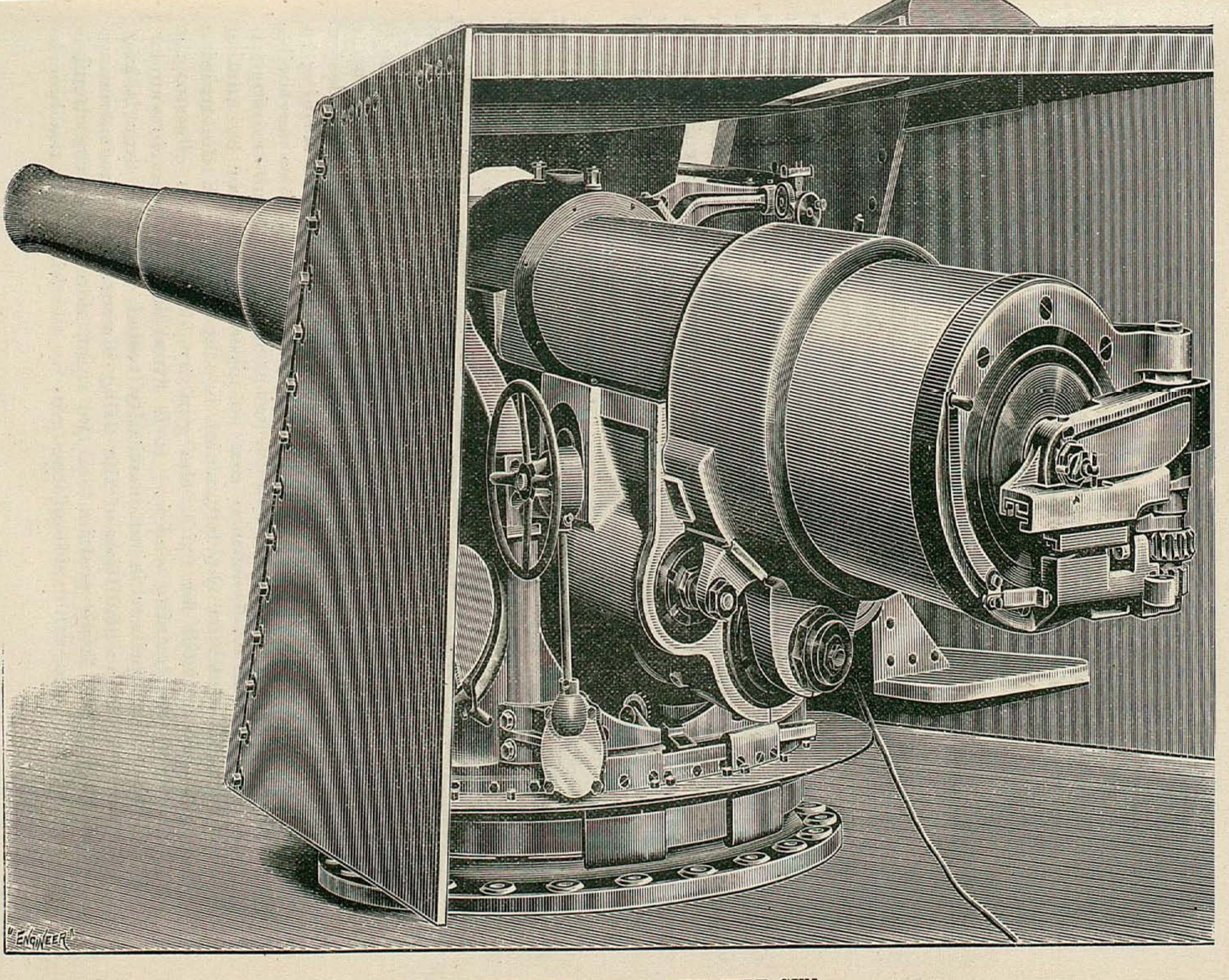


Fig. 4.—ELSWICK 8-in. QUICK-FIRE WIRE GUN.

gun is being loaded, the opening and closing of the breech performs this automatically. A lanyard may be attached to the trigger and worked from either the right or left of the gun. The cradle is made of steel, bushed with gun-metal where it comes in contact with the gun. There are trunnions on the line about which the loaded gun and cradle balance, and special anti-friction gear is used to reduce the friction caused by elevating, so that the gun can be easily elevated or depressed by one man. The recoil press is underneath the cradle, the cylinder being bored out of a solid steel forging. A tank in communication with the cylinder contains a reserve supply of oil, so that there may be no risk of the cylinder becoming partially empty. Two running-out springs are placed under the cradle, each in sections, so that in case of injury a spare section can readily be inserted. The springs can be removed from the mount in their compressed condition without difficulty. A bracket projects from the right side of the cradle, to which is fitted the sight, which is on the "Elswick bar and drum pattern." Two side brackets which support the trunnions of the cradle are riveted to a steel platform which forms the upper roller path. On the right side there are brackets for the elevating and training hand wheels, which are conveniently placed for a man aligning the sights.

While the convenience of sighting with the right eye has not been neglected, some important advantages have been gained by placing the firer on the right-hand side of the gun. The powder hoist is made to deliver the charge on the left side of the gun, and it can be served to the loader without being passed round the breech screw, which, when open, is on the right of the gun. This would be impracticable if the man who trains, elevates, and fires the gun were placed in the usual position on the left side.

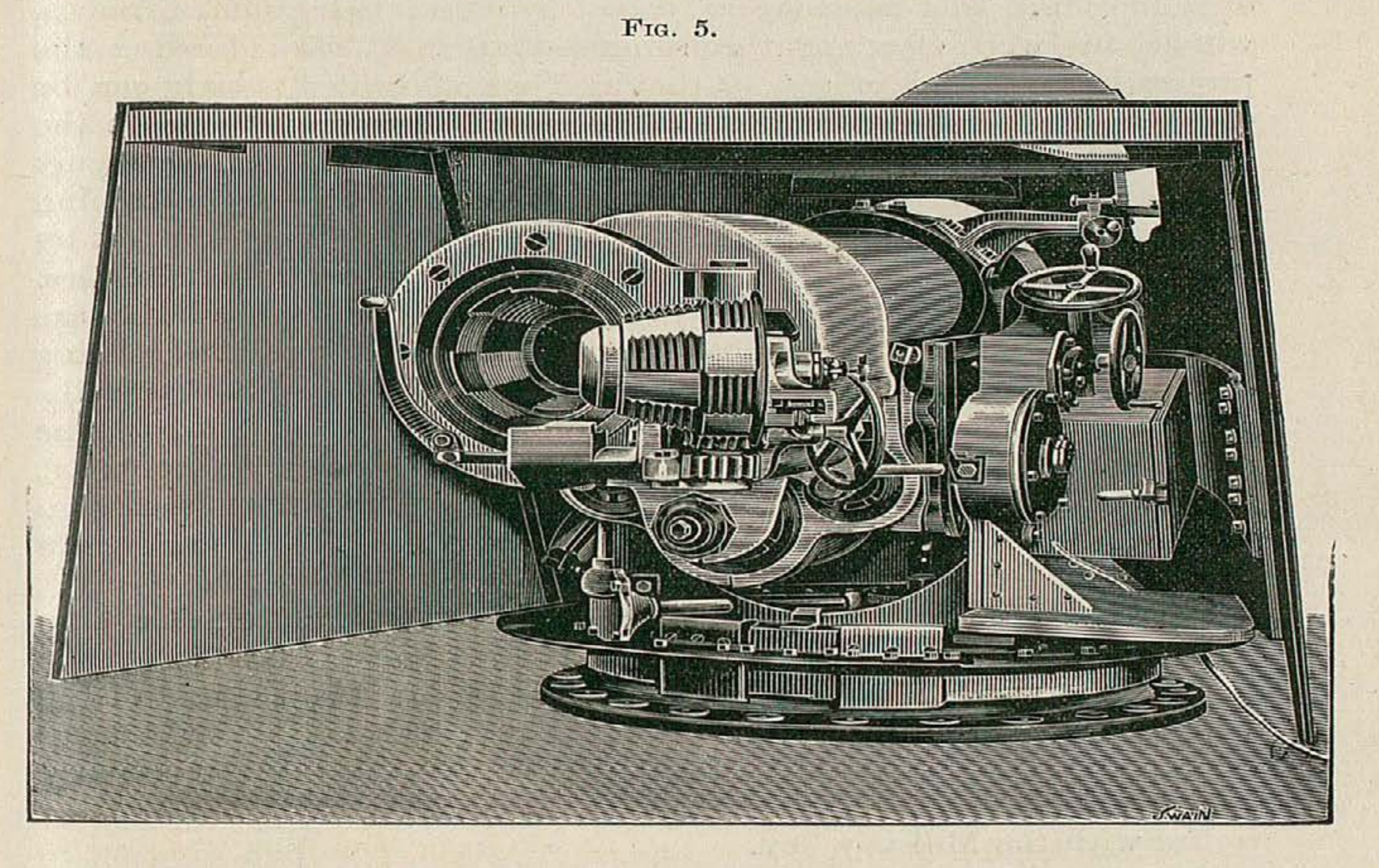
The training gear of this mount can be worked by one man, although the revolving weight amounts to forty-two tons; but the mounting is also fitted with electric training gear, on a most simple design. The man aiming manipulates the same wheel, whether training by hand or by electricity; only in the latter case there is no perceptible effort required. If the dynamo is not at work and hand training has to be resorted to, assistance can be given to the firer by another working a wheel on the left, which is coupled up with the training gear. The pistol for firing the gun by electricity is close to the elevating and training wheels. It is fitted with an electric sounder, so that each primer is automatically tested, and the firer is kept informed of the condition of the firing circuit. Another advantage of placing the firing position on the right side is, that the circuit is entirely on the same side of the gun as the hinge for the breech-

screw carrier, and a short and simple circuit can therefore be arranged.

The mount works on a ring of live rollers, protected from hostile fire by being placed at a lower level than the deck, and surrounded by a plate. Clips attached to the upper roller path, and hooked under the lower roller path, prevent the front of the mount from rising when the gun is fired. The shield has a thickness of 4-in.; but the sides of this shield are prolonged to the rear by $1\frac{1}{4}$-in. plates, and

ELSWICK 8-IN. QUICK-FIRE WIRE GUN.

FIG. 5.



the whole shield is so arranged that it balances about the axis of rotation of gun and mount. Special elastic attachments fasten the shield to the lower carriage, so that considerable distortion may be suffered without injury to the mount. Central loading is provided for in the case of the powder charge, but the shot are taken from racks placed close at hand. The powder hoist is capable of very rapid working. Two cages travel in it in such a manner that as one ascends the other descends. The only weight lifted, therefore, is the weight of the charge, which is 52-lb. of cordite. By a simple shunting contrivance the cages pass each other in the middle of the hoist, and

there is only one delivery orifice to the hoist for the two cages, this being on the left-hand side of the mount. The cages can be hoisted by a quick-working hand-winch, whatever the position of the mount. A door is formed at the bottom of the hoist, which can be inclined for supporting the cages when the charges are inserted. Although the cages incline at the bottom of the tube for receiving the charge, and at the top for delivering it, they are securely locked in a vertical position at all other times.

The hoist is well protected by armour-plates, which are arranged so that certain plates can be removed in case the hoists require examination. The cages do not travel in close tubes but in frames, which are well clear of the armour-plates. Before loading the projectile is placed in a tray provided with handles, which can be conveniently lifted by two men. The tray serves to protect the breech-screw threads and guides, and guides the shot into the gun. A separate motion for sponging is rendered unnecessary by combining the sponge and rammer; but the sponging is made very efficient by a sponge head, provided with alternate rings of wool and bristles. The function of the former is to contain water, while the latter are secured at an angle so as to offer no resistance when the shot is being rammed, but which endeavour to stand up as the rammer is withdrawn, compress the saturated wool, and effectually sponge out the chamber. Although the electric-firing system has many advantages, it is customary at Elswick to make such arrangements that percussion firing can be resorted to if necessary, and the transfer from one system to the other can be rapidly made.

Should a miss-fire occur, or should the electric sounder fail to ring when the gun is in the "ready" position, the spare circuit can be instantly connected by pushing a split pin, secured to the end of the wire, into a hole into the head of the striker; this will put the spare circuit in connection with the insulated pin, and cut out the ordinary circuit and battery. When the spare circuit is used it is necessary to fire with the McEvoy key.

The Elswick system of breech mechanism.—The breech screw is on the principle of the interrupted screw, but the forward portion is tapered, the rear portion being cylindrical. Two advantages are claimed for this arrangement:—First, the working of the breech mechanism is greatly facilitated, as the withdrawal and bringing away of the breech plug can be done in one motion; and secondly, the coned shape enables the screw to distribute the engagement over a much greater portion of the transverse section of the gun. The breech screw is further arranged so that the threads of the coned portion correspond longitudinally with the plain spaces of the

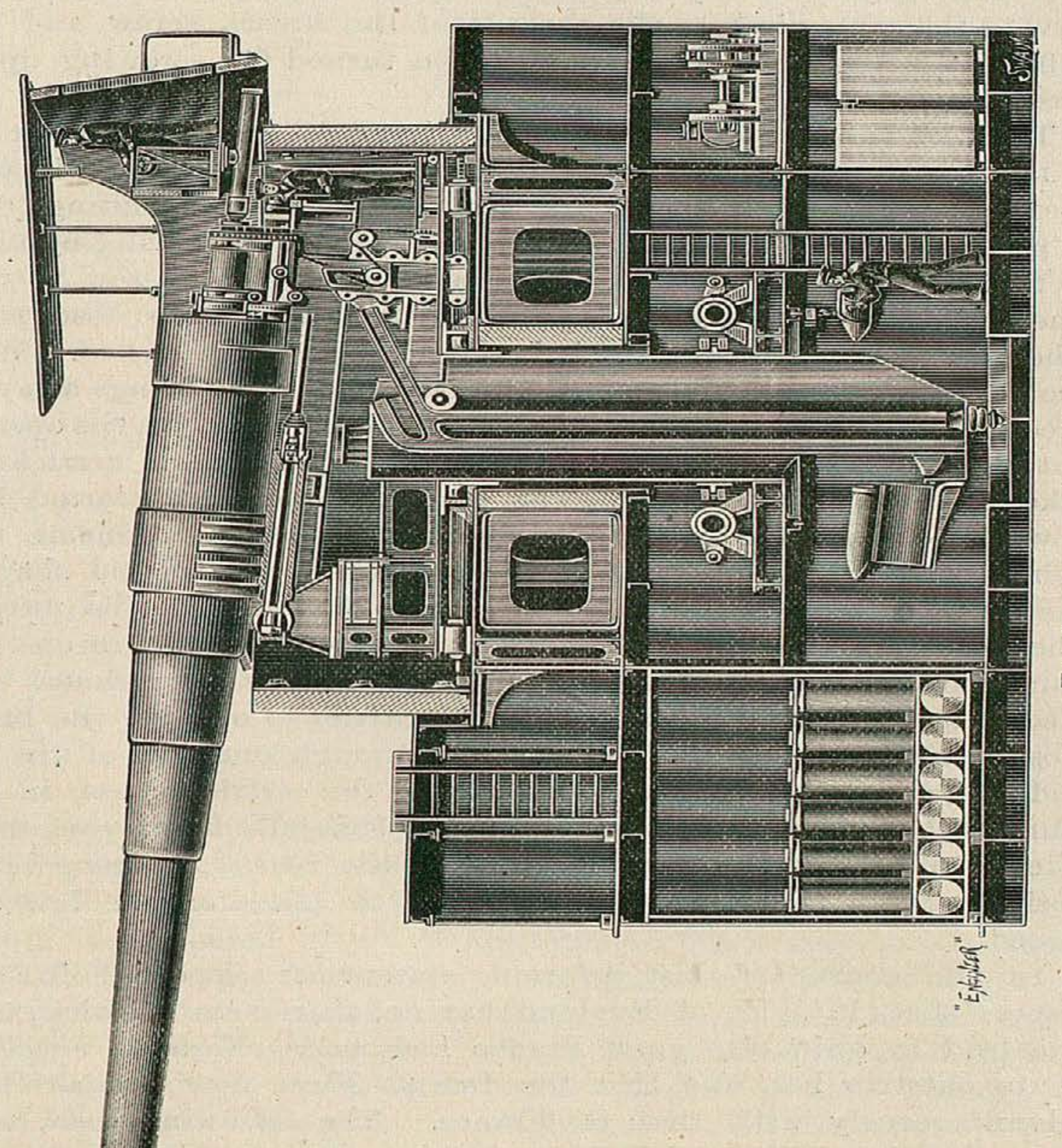


Fig. 6.

ELSWICK 8-IN. QUICK-FIRE WIRE GUN.

cylindrical portion and *vice versâ*; thus the strain is distributed throughout the entire circumference of the breech screw. The breech plug passes on to the central projection of the carrier from the front, and is prevented from coming off by a bolt, which screws into the breech plug, and has a plain end fitting into a groove in the carrier, having the same pitch as the threads of the breech screw, and is of sufficient length to allow the bolt to be turned for screwing up the breech.

The gear is operated by means of a hand lever, on the lower side of the breech plug, which works in a horizontal plane. It pivots on the carrier, and is attached by a connecting rod to a sliding block. A pin in the breech plug works in a vertical slot in the sliding block, so that a horizontal motion of the latter causes the screw to turn. The centres about which the gearing works are on their dead points when the screw is closed, and it is therefore perfectly locked. When the lever is swung round it first unscrews and then brings away the breech plug, the two motions being combined so as to give the operator but one. The extraction in the larger rapid-fire guns is arranged to take place in two motions. The cartridge cases are started by a powerful extractor, which has only sufficient motion to ensure their being free for the remainder of the extraction, the conical shape of the chamber rendering a small amount sufficient for this purpose. The cases are then withdrawn and placed on deck by means of a hand extractor, which fits over and firmly holds the primer. The mechanical extractor is worked by the carrier in opening the breech closure. It consists of a rod passing through one side of the gun, and fitting into the groove for the rim of the cartridge case, in such manner that when turned about its own axis, the fitted part acts as a lever and forces the cartridge case to the rear. A strong helical spring serves to return the extractor to place as the breech is closed.

The supply of quick-fire guns.

In the course of last autumn, statements appeared in daily papers that, in spite of England having, thanks to Elswick, taken the lead in quick-fire guns, France had made efforts so successful as to outstrip her, and that the British Fleet now compared disadvantageously with that of France. The following data, taken from the *Naval Annual* Tables of this present volume, may give an idea of the relative position of the two fleets in the matter of quick-fire armaments.

First, as to actual numbers, taking ships "building" as well as those completed, but having excluded ships only "projected and not commenced," the following figures are obtained:—British ships, total number armoured, 86; unarmoured, 212. French,

armoured, 64; unarmoured, 93.* The quick-fire guns for these are:—

British Armoured.

6-in. ...	218	430
4·7-in. ...	56	
12-pounders (3-in.) ...	156	
6 „ ...	437	
3 „ ...	670	
	1537	

French Armoured.

16 cm. (6·3-in.) ...	24	310
14 „ (5·5-in.) ...	181	
10 „ (3·9-in.) ...	105	
6·5 (8·8-pounders) ...	50	
4·7 cm. ...	271	
3·7 „ ...	175	
	806	

British Unarmoured.

6-in. ...	227	753
4·7-in ...	412	
25-pounder (3·5-in.) ...	6	
12 „ (3-in.) ...	108	
6 „ ...	454	
3 „ ...	560	
	1767	

French Unarmoured.

16 cm. (6·3-in.) ...	99	347
14 „ (5·5-in.) ...	110	
10 „ (3·9-in.) ...	138	
6·5 „ ...	35	
4·7 „ ...	221	
3·7 „ ...	145	
	748	

If these quick-fire guns be considered irrespective of their calibre, it will be seen that the average number per armoured ship is, for England 17·9, against 12·6 for France; and for unarmoured, 8·3 for England, as compared with 8·0 for France; but it may be seen that in the armoured ships France is as strong proportionally as England in heavier and more powerful quick-fire pieces, having, in fact, 310, against 430 of the English, and the French guns are of heavier metal, for the 12-pounder is included among the English pieces. This gives 5·0 for heavy quick-fire guns per English armoured ship and 4·8 per French armoured ship. In this respect also France is stronger in her unarmoured vessel armaments, England having 753 heavier quick-fire pieces, as compared with 347 French, which makes 3·5 per English unarmoured ship and 3·7 per French unarmoured ship. Thus France

* These numbers are substantially correct, though not absolutely so. A few French guns whose calibres are not given are set down as 10-cm. pieces, so also is one gun which is given as 90-mm., which if it exists appears to stand alone in the French Navy.

has an absolute advantage in one respect, that is in heavy quick-fire guns in the equipment of her ships, while she is inferior in the total number of quick-fire guns of all calibres per ship. When the fact is taken into account that we have to deal with 298 ships of all kinds, France with only 157, involving a total of 3304 pieces as compared with 1554, it will be seen that it could not with any justice be said that France is in advance of us in the work of supply if bare numbers only be considered. A mere statement of numbers may, however, be misleading. We have included many ships which are small and obsolete, which would only receive quick-fire guns under special circumstances, and, on the other hand, ships under construction. Both these may affect the results unfairly. The obsolete ships, which naturally have not been well supplied, may pull down the average, and the nation that builds its ships more slowly, and therefore has more in hand in proportion to her rate of turn out, benefits unfairly by reckoning ships building, yet it seems desirable to take some total number that has been arrived at without reference to our immediate object, and on good authority, in order to be clear of bias. It must be understood, however, that our vessels going into action would naturally be so far selected that they would have a much larger number of guns than this average. To pass on next to the character of the pieces. Our own heavier guns are of the Elswick types, with light Hotchkiss 6-pounders and 3-pounders and Nordenfelt 6-pounders. The French pieces consist in a great measure of converted guns, the remainder being new pieces, chiefly those of Canet. The French converted guns have certain distinct disadvantages, both in being of older type and inferior power to the new pieces, and also in power of quick-fire. The Canet guns are excellent, but there is no justification for the recent attack made on our Elswick pieces in the press. We have brought quick-fire guns to conform to the conditions of service before our neighbours. If a lower rate of fire is claimed for our guns, it will generally be found to be due to the fact that our guns performing at sea under service conditions are compared with Continental guns firing on a practice ground. It may be expected that the above relations will be greatly changed now that we have adopted a system of conversion; nevertheless, good work has been done in calling attention to the rapid strides that France has made, enabling her to compare as well as she does with us, seeing what a start we had of her.

United States report on quick-fire guns.

The following facts are taken from the report of the chief of the Bureau of Ordnance of the United States for 1894:—

The supply of quick-fire guns to the Navy has been continued

this year, 4-in. and smaller pieces being placed in the Essex, Alliance, and other vessels, and a supply of 5-in. quick-fire guns being sanctioned.

Armour-piercing projectiles for calibres from 13 in. to 4 in. have been made by the Carpenter and Sterling companies ; in all 9572 and 70,128 steel common shells have been supplied by the United States American and Taylor companies. Cast-iron shell are no longer made. **Projectiles**

During the year some experiments were made on the power of shells charged with wet gun cotton, fired by a detonator and dry cotton primer. An 80-lb. shell thus charged produced an enormous crater when fired with a velocity of 1400 ft.-secs. into a hill side, but had little effect against a 7-in. armour plate. On increasing the charge to give 1800 ft.-secs. velocity, the shell, whose walls were only 0·3 in. thick, broke up in the bore, the explosion enlarging the bore considerably. It is proposed to manufacture 10-in. shells to contain 70 lbs. of gun cotton, to be fired with a charge giving 1700 ft.-secs. muzzle velocity. Elsewhere in the report is mentioned the fact that gun cotton exposed to prolonged heating at 100° may have the temperature at which it ignites lowered. **Gun cotton in shells.**

As noticed elsewhere, the holes in Harveyed armour are made by means of "electric annealing," the difficulties experienced in this country when nickel is present in the metal not having apparently been felt in America, or having been overcome. Nickel steel has proved itself the best material for small arm rifle barrels. **Armour and nickel steel.**

Much of the matter dealing with armour in this report is more clearly discussed in Captain Sampson's paper on this question, read before the American Society of Naval Architects.

An automatic 1·46-in. machine gun * has been designed by Maxim, in which the ammunition is supplied on a belt drawn through by the gun itself, as in the case of the rifle calibre piece. It is specially intended to meet torpedo attack, its projectiles being capable of perforating a lightly protected boat and containing bursting charges. It is said that 240 rounds per minute have been fired. **Maxim automatic 1·46-in. quick-fire gun.**

A Canet * 10 cm. (3·94-in.) gun 80 calibres long has been fired at the Hoc Polygon, when a muzzle velocity of 826 metres (2710 ft.-secs.) was obtained with brown powder, and 1026 metres (3366 ft.-secs.) with smokeless powder with a pressure of 18·9 tons per square inch, and 1006 metres (3301 ft.-secs.) with a pressure of 17·68 tons. No sensible deflection was noticed in the bore. **Canet 80 calibre 10 cm. gun.**

An explosion took place at Waltham Abbey on May 7th, 1894, which calls for a short notice here chiefly on account of its bearing **Waltham Abbey explosion.**

* From U.S. information from abroad.

on the question of safety in dealing with cordite. The accident attracted public attention in an unusual degree because it had been preceded by others, one as recently as December 13, 1893. The explosion on May 7th took place in a washing-house for nitro-glycerine, and also in a nitro-glycerine store situated sixty yards apart on Quinton Hill. It appears to have commenced at the washing-house, and was attributed by the committee appointed* to investigate it to a shock caused by a blow or fall of some part of the fittings. The temperature at which the nitro-glycerine has been washed, namely 122° Fahr., appears also to be too high for safety. It will be seen, then, that although this accident occurred in the manufacture of cordite, it in no way affects the reputation that cordite has established for safety as a finished product issued for service. It has been pointed out† in a former discussion of cordite that the element nitro-glycerine is excessively dangerous before it is embodied with the cellulose and formed into cordite. The safe character of the finished compound was, however, illustrated by its behaviour in connection with the explosion in question, for there happened to be a large store of 3000 lbs. of cordite drying in hot air in a building only eighty-five yards from the spot where the nitro-glycerine went off. This cordite was actually injured by falling *débris* and fragments of the building which was crushed by the explosion, yet none of the cordite was either exploded or ignited, so that it compared well with what might have been expected from gunpowder or guncotton.

Lt.-Col. Baker on cordite.

With regard to the behaviour of cordite when fired in a gun, Lieut.-Colonel Baker, in a paper read at Birmingham, stated that with it three shots have been fired through the same hole in a target at 2000 yards range, which is a feat equivalent to hitting a shilling three times at 400 yards range.

Cordite at Elswick.

At Elswick a muzzle velocity of 4800 ft.-secs. has been achieved from an experimental gun with a cordite charge.

Sir Andrew Noble on measuring pressures in the bores of guns.

Sir Andrew Noble read a paper at the British Association meeting at Oxford on the methods adopted for measuring pressures in the bores of guns which must naturally command the attention of those interested in this subject. The matter of paramount importance is that of wave action in the bore of a gun and its suppression.

Jaques on ordnance.

A paper read by Captain Jaques before the United States Naval Institute, Annapolis, on May 24th, 1894, gives a valuable summary of the state of gun and powder questions in the States. He considers

* Consisting of Lord Sandhurst, Sir F. Abel, Col. Majendie, and Maj.-Gen. Lloyd.
† See the *Naval Annual* for 1893, page 321.

that cordite is the best established smokeless powder, but that a new compound called the Leonard powder, produced in America, promises well. He suggests that the wearing of the bores of guns, which is so serious at present, may end either in the substitution of less erosive powders at some sacrifice of ballistic results, or in the fortifying of the bore against erosive action by mechanical mandreling, cold rolling, or other mechanical means which seems to promise more than chemical treatment. The wire system of construction, the writer says, has not met with favour in America; the best-known example is the Brown gun, which consists of a steel "liner" * enclosed in a segmental tube supported by coiled wire.

The Baden Krupp gun accident.

In the *Naval Annual* for 1894, a Krupp gun was said to have burst on board the Baden; seeing that 9 men were killed and 18 wounded in the reported accident, the fact that the gun had actually burst was never doubted. This, however, was not the case. The following is a translation of a portion of the official report on the matter:—"A bursting of the gun did not occur at all; the accident, occasioned by the coincidence of several adverse circumstances, merely consisted in the ignition of a 26-cm. war cartridge of 48 kilos of black prismatic powder, c. 75, when being introduced into the gun, which accident blew out the unsecured breech-piece and pushed forward the loaded shell—which was already rammed home—up close to the muzzle." The shell was blown out after a little delay and difficulty, owing to the charging tube being bent and wedged at the breech. The gun was then perfectly fit for service and continued in use, having, in fact, had less strain on it than occurs in an ordinary round. It would have been interesting to learn how so unusual an accident as the ignition of a charge of prismatic powder, followed by such fatal consequences occurred, but this in no way bears on the character and behaviour of the gun itself.†

Penetration of small bore bullets.

Some curious trials of the effect of small-bore bullets on obstacles, and also on human and animal tissue, have been made in England and America. Colonel Fraser's committee on penetration report that 9 in. of brickwork kept out Lee-Metford and Mannlicher rifle bullets except at the joints, at longer ranges, but at 200 yds., breaches were actually made by concentrated fire, 200 bullets making a hole 24 in. by 15 in. Even a 14-in. wall had a smaller breach made in it by 1028 rounds. Sun-dried brickwork 18 in. thick is bullet-

Brickwork.

* It may be questioned if the word "liner" ought to be used for an inner tube, on which outer layers are applied by actual shrinking, or with calculated tension. The word originally meant a tube inserted to replace a worn portion cut out and depending only on mechanical fit.

† A somewhat similar accident once occurred with a British gun, before sponging came in for breech-loading guns, which was attributed to ignited residue left by a previous round.

proof except to very long-continued firing, but fresh mud required to be 4 ft. thick. Mild steel or wrought-iron 0·44 in. thick stopped bullets, and at ranges over 60 yds. a 0·206 in. hardened steel plate stopped the Lee-Metford, and one 0·25 in. thick stopped the Mannlicher, and is recommended for sap shields. At 500 yds. a hardened steel plate less than 0·1 in. thick, weighing 3 lbs. 10 ozs. per square foot, stopped all bullets, and might serve for field artillery shields. So great is the penetration of small-bore bullets through wet and dry timbers that balks and standing trees seldom offer much protection under 1000 yds. range. On the other hand, sand has great stopping power; 18 in. of sand or 3 in. of flint shingle between boards will stop bullets at all ranges. Cotton bales 20 in. thick stopped bullets when placed end on.

Steel.

Wood.

Sand and shingle.

It appears as if the key to what may be expected lies in the fact that high velocity overcomes the resistance of cohesion much more than that of inertia; hence wood is cut easily, while particles of sand and shingle, which have to be displaced, offer considerable resistance.

Striking effect on animal tissue.

As to effect on animal tissue, Lieutenant Benet reports that in experiments made in the United States the "cadaver," apparently a human corpse, suffered from what are termed "explosive" effects up to 250 yards with the 0·45-in. bore, and 350 yards with the 0·30-in. bore. Bones were less shattered by the smaller bullet, and sometimes perforated clean. This is contradictory to results obtained in England with a dead horse, when the bones splintered terribly, being probably harder than human bones. Also, the splintering action may have been affected by the fact that a bullet fired at low velocity has less rotation than one originally fired at a high velocity, and only reduced by resistance of the air, which tells comparatively little on the velocity of rotation. It has been suggested that to stop a rush of savages it is necessary to fire low, as bullets which might be little felt in many parts of the body would break legs. Certainly it has repeatedly happened that men have had small-bore bullets pass through fleshy parts without being very sure whether they had been hit at all.*

Victor Horsley on effect of bullets on animal tissue.

Victor Horsley gave the results of a very remarkable series of experiments made by him on the effect of bullets entering animal tissue at a high velocity, from which it appeared that disruptive effects were produced chiefly by the sudden displacement of the inelastic fluid present in living tissue. The experiments were chiefly conducted with reference to penetration of the brain, but the prin-

* One case occurred in the coal riots in Yorkshire in 1893, when a miner had been shot through the flesh of the thigh, and only discovered the nature of his wound when walking about subsequently.

ciples established bear upon other tissue. A bullet passed through a dry skull, from which the brain had been removed, making only a small hole in entering and in exit; but when the brain cavity was partly filled with water, the bullet split the skull, remaining in it. The effect produced in clay, dry and wet, and other media, bore out the conclusions arrived at. A living dog, under the action of ether, was shot through the brain, curious records of the behaviour of heart and lungs being taken. The lecturer objected to the United States experiments quoted above as misleading, because the liquid in human tissue becomes solidified at death, and the disruptive effects then are not produced. Nor are they seen in penetrating any elastic mass such as the softer and thinner parts of limbs. The cause of violent disruption is declared to be the flying outwards of inelastic matter, especially liquid.

NOTES OF

ALTERATIONS IN TABLES OF ORDNANCE.

In most cases the perforation of projectiles having a velocity of 2000 f.s. and over is calculated on Krupp's system. There can be little doubt that the English systems give too low a perforation when the velocity is high. All formulæ agree at about 1580 f.s. It would avoid inconsistencies to employ that of Krupp for all higher velocities, but at present the service system is kept up to 2000 f.s., which includes the muzzle velocities of the projectiles fired from most of the service guns, because it seems undesirable to make small corrections on the very uncertain data which exist.

In the Table of British Rifled Ordnance, the column showing the capacity of the chamber has been struck out, in order to make room for one showing cordite charges where they exist. One 7-inch L.S. M.L. gun is also struck out, and the new 12-inch B.L. wire gun and some new Q.F. wire guns are inserted. The French Table has considerable alterations, many of the muzzle velocities being a little lowered. The Austrian, German, and U.S. Tables have a few changes. In the last, the perforations are now all calculated on Krupp's formula. Three new Q.F. guns are entered in the Elswick sheet, and an entirely new Table is given of the Krupp Q.F. guns, there being considerable increase in the lengths and muzzle velocities.

Attention is called to the fact that the rates of firing with the Elswick Q.F. guns are obtained at sea under service conditions.

BRITISH RIFLED ORDNANCE.

(Chiefly founded on the official "List of Service Ordnance, 1891," brought out in the Autumn of 1891. Corrected by Official Card List, 1894, and subsequent information.)

Ordnance. Nature. Calibre or Pr.	Nature. Weight.	Nature. Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Chamber. Diameter.	Chamber. Length to base of projectile.	Rifling. Twist one turn in Least at breech.	Rifling. Twist one turn in Greatest at muzzle.	System.†	Charge (full). Weight.‡	Charge (cordite). Weight.	Charge (cordite). Size.	Projectile. Diameter.	Projectile. Weight.§	Projectile. Bursting Charge of Common Shell.	Projectile. Value of $\frac{d^2}{w}$.	Projectile. Value of $\frac{w}{d^3}$.	Projectile. Muzzle velocity.	Ballistics (with full charges.) Total muzzle energy.	Ballistics. Muzzle energy per ton of gun.	Perforation of wrought iron. At muzzle.	Perforation of wrought iron. At 1000 yards range.	Perforation of wrought iron. At 2000 yards range.
				calbs.	ins.	ins.	cals.	cals.		lbs.	lbs. oz.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft tons.	ins.	ins.	ins.
B.L. Guns. 16·25-in.	110½ tons.	I.	524·0	30·0	21·125	84·5	130	30	P.E.O.C.	960 S.B.C.	..	..	16·25	1800	‡‡187½ **179¼	0·147	0·420	2087	54,390	492	37·5p	32 0	30·1
13·5-in.	69 & 67 tons.	I. II. III. & IV.	433·0	30·0	18·0	66·5	120 or 60	30	P. Rifling increasing twist, in E.O.C. System from 0. Hook Sect. II. from 1 in 60; all others belong to Hook Sect. I. except 12-in. wire, which is special.	630 S.B.C.	..	..	13·5	1250	**85 9/16	0·146	0·508	2016	35,230	511 526	34·2p	28·2	26·4
12-in.	45 & 46 tons.	III. IV. V. & V_{w}	328·5	25·25	16·0	48·0	120	35		259 P.Br.	..	..	12·0	714	31 9/16 ‡‡95 **79	0·202	0·413	1914	18,130	403 394	22·6	20·6	18·8
12-in.	46 tons.	VIII. Wire	445·5	35·43	16·0	70·0	0	30			..	..	12·0	850		0·169	0·492	2400	33,940	738	38·5p	34·6p	31·2p
10-in.	29 tons.	II. III. $III._{A}$ & IV.	342·4	32·0	14·0	54·0	60	30		252 P.Br.	..	..	10·0	500	37¾	0·200	0·500	2040	14,430	498	25·4p	20 4	18·6
9·2-in.	21 & 22 tons.	I. & II.	255·8	25·56	11·0	44·0	118·5	35		140 P.Br.	..	..	9·2	380	18½ ‡‡33	0·223	0·488	1781	8,356	411 392	17·7	16·6	14·4
9·2-in.	24 & 22 tons.	III. V. VI. $VI._{A}$ & VII.	310·0	31·5	12·0	43·0	120	30		166 P.Br.	..	..	9·2	380	**31 14/16	0·238	0·477	2035	10,910	455 496	22·9p	18·3	16·6
8-in.	13 & 14 tons.	III.	226·3 222·5	25·6	10·5	34·5	120	35		10¼ P.Br.	..	..	8 0	210	13½ ‡‡29	0·305	0·410	1953	5,554	427 397	15·4	13·4	11·7
8-in. 8-in.	15 tons. 14 tons.	IV. VI.	254·5	29·6	10·5	38	110 60	35 30		118 P.Br.	..	..	8·0	210	‡‡18½	0·305	0·410	2150	6,730	449	19·0p	14·9	12·9
6-in.	80 cwt.	(80 pr.)	165·6	26·0	7·5	27·4	0	40		3¼ S.P.	..	..	6·0	78·44	6 2/16 ††7¾	0·450	0·370	1880	1,961	490 484	10·5	8·4	6·8
6-in.	89 cwt. 5 tons.	III. a III. b	170·7	25·53	8·0	26·75	120	35		36 E.X.E. 48 E.X.E.	..	..	6·0	100	7 6/16 **9 13/16	0·360	0·463	1672	1,938	212	10.6	8.8	7.4
6-in.	5 tons.	IV. VI.	173·5	26·0	8·0	26·75	120 60	35 30		48 E.X.E.	14 12	20/14	6 0					1960	2,665	533·	12.4	10·5	8·9

The Roman numeral is the number of the pattern given.

* Further differences in pattern are indicated by letters A, B, and C. † P. means Polygroove; Pl., Plain; W., Woolwich; F., French; F.M., French modified; H., Henry; E.O.C., Elswick Ordnance Co.
‡ S.B.C. (in column for charge) means Slow-burning Cocoa; P.Bl. stands for Prismatic Black; P.Br. for Prismatic Brown; Pb., Pebble; R.L.G., Rifle Large Grain; L.G., Large Grain; E.X.E., Experimental letter E.
§ For the higher natures the weight of projectile given is for Palliser shot; for the lower natures it is for filled common shell. ** Cast steel. ‡‡ Forged steel. †† Double shell.
a Unchase Hooped. *b* Chase Hooped. *p* Perforation by Krupp's formula.

BRITISH RIFLED ORDNANCE—*continued.*

(Chiefly founded on the official "List of Service Ordnance, 1891," brought out in the Autumn of 1891. Corrected by Official Card List, 1894, and subsequent information.)

	Ordnance.										Charge. (full).	Charge, cordite.		Projectile.						Ballistics (with full charges).				
	Nature.					Chamber.		Rifling.														Perforation of wrought iron.		
								Twist one turn in																
	Calibre or Pr.	Weight.	Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Diameter.	Length to base of projectile.	Least at breech.	Greatest at muzzle.	System.†	Weight.‡	Weight.	Size.	Diameter.	Weight.§	Bursting Charge of Common Shell.	Value of $\frac{d^2}{w}$.	Value of $\frac{w}{d^3}$.	Muzzle velocity.	Total muzzle energy.	Muzzle energy per ton of gun.	At muzzle.	At 1000 yards range.	At 2000 yards range.
					calbs.	ins.	ins.	cals.	cals.		lbs.	lbs. ozs.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft. tons.	ins.	ins.	ins.
B.L. GUNS.	5-in.	38 cwt. 40 cwt.	II. III. IV. & V.	139·15	25·07 25·0	5·75	19·05	117 120	30 25	All Hook Section I. or II. P.	15·5 S.P.	4 7¼	$\frac{7.5}{11}$	5·0	50	$4\frac{1}{16}$ ‡‡$6\frac{15}{16}$	0·500	0·400	1770	1,124	590 562	8·7	6·8	5·4
	4-in.	23 cwt. 26 cwt.	II. II.$_p$ III. IV. V. & VI.	120·0	27·0	5·3	18·5	120	30		12 S.P.	3 1	$\frac{5}{11}$	4·0	25	$2\frac{14.5}{16}$	0·640	0·391	1900	625	544 481	7·2	5·4	4·0
	20-pr. (3·4)	12 cwt.	I. (L.)	107·5	29·0	3·9	15·5	120	25		6 S.P.	..	..	3·4	19·5	$2\frac{1}{16}$	0·593	0·496	1677	380	633	..	..	..
	12-pr. (3·0)	7 cwt.	I. (L.)	92 35	28·0	3·63	11·0	120	28		4 S.P.	1 0½	$\frac{5}{11}$	3·0	12·5	‡‡$1\frac{8.5}{16}$ $\frac{10}{16}$	0·720	0·463	1720	249	740	..	..	..
M.L. GUNS.	17·72-in.	100 tons.	I. L.	391·8	20·48	19·7	59·72	150	50	P.Pl.	450 Pr¹ Bl. or Pr².	..	..	17·72	2000 0	106	0·157	0·359	1548	32,700	327	24·6	22·7	20·9
	16-in.	80 tons.	I.	321·0	18·0	18·0	59·6	0	50	P.Pl.	450 Pr.¹ Br	..	..	16·0	1700 0	$75\frac{6}{16}$	0·151	0·415	1540	27,960	350	24·3	22·5	20·9
	12·5-in.	38 tons.	I.	230·0	15·84	Unchambered		0	35	W.	130 Pr.² or 165 Pr.¹ Bl													
	12·5-in.	38 tons.	II.	222·8	15·84	14·0	41·125	438	35	W.	200 E.X.E. 210 Pr.² or Pr.¹ black	..	..	12·5	818·0	$37\frac{8}{16}$	0·191	0·419	1442 1575	11,820 14,070	311 371	17·4 19·3	16·0 17·5	14·7 15·9
	12-in.	35 tons.	I. (L.)	195·0	13·54																			
	12-in.	25 tons.	II.	182·5	12·09	Unchambered		0	35	W.	110 Pb.²	..	..	12·0	714·0	$34\frac{10}{16}$	0·202	0·413	1390	9,566	273	15·9	14·5	13·2
	11-in.	25 tons.	II.	180·0	13·18	"		100	50	W.	85 Pb.²	..	..	12·0	614·0	$28\frac{2}{16}$	0·235	0·355	1292	7,190	288	13·4	12·1	11·0
	10-in.	18 tons.	II.	180·0	14·55	"		0	35	W.	85 Pb.	..	..	11·0	548·0	27	0·221	0·411	1360	7,028	281	14·2	12 9	11·7
	9-in.	12 tons.	V.	156·0	13·89	"		100	40	W.	70 Pb.	..	..	10·0	410·0	23½	0·244	0·410	1379	5,408	300	13·1	11·7	10·5
	9-in. ‖	12 tons.	VI. (L.)	156·0	13·89	"		0	45	W.	50 Pb.	..	..	9·0	256·0	17	0·316	0·351	1440	3,681	307	11·4	9·8	8·5
	8-in.	9 tons.	III.	144·0	14·75	"		100	35	P.	50 Pb.	..	..	9·0	360·0	‡‡$27\frac{12}{16}$	..	..	1194	..	..	..	..	..
	7-in.	90 cwt.	I.	131·0	15·86	"		0	40	W.	35 Pb.	..	..	7·92	179·0	→ $17\frac{12}{16}$	0·358	0·350	1390	2,398	266	9·7	8·2	7·1
	7-in.	6½ tons.	III.	133·0	15·86	"		35 35	35 35	W. W.	22 Pb. 30 Pb.	.. ..	.. ..	6·92 6·92	114·6	→ $11\frac{1}{16}$	0·428	0·334	1325 1525	1,395 1,848	310 284	7·9 9·2	6·5 7·2	5·7 5·9
	64-pr.	64 cwt.	III.	118·0	15·47	"		40	40	Pl.	10 R.L.G.[4]	..	..	6·28	64·5	→ $8\frac{8}{16}$	0·588	0·271	1390	865	270	..	..	..

M.L. GUNS.	64-pr.	71 cwt.	I.	122·2	16·42	Unchambered		40	40	Pl.	8¼ R.L.G.[4]	..	..	6·29	64·5	→ 8 5/16	0·588	0·271	1260	715	201	..	..	..
	40-pr.	35 cwt.	II. L.	120·0	22·0	,,		35	35	W.	6¾ R.L.G.[4]	..	..	4·75	38·8	→ 3 6/16	0·582	0·362	1425	546	312	..	..	..
	25-pr.	18 cwt.	I. L.	98·0	22·0	,,		35	35	W.	4½ R.L.G.[4]	..	..	3·94	24·96	→ 1 13·5/16	0·622	0·408	1350	315	350	..	..	..
	16-pr.	12 cwt.	I. L.	78·0	19·0	,,		30	30	F.M.	3 3/16 R.L.G.[4]	..	..	3·54	16·1	→ 1 2/16	0·771	0·366	1355	205	342	..	..	..
	15-pr.	422 lbs.	I. L.¶	70·5	20·0	3·2 (decrsd.)		60	20	..	1½ R.L.G.[2]	..	..	3·3	14·25	2 6/16	..	..	1040	113	600	..	..	..
	13-pr.	8 cwt.	I. L.	92·0	28·0	3·15	14·13	100	30	P.	3¼ R.L.G.[4]	..	..	3·0	13·0	11/16	0·689	0·484	1595	232	580	..	..	..
	9-pr.	8 cwt.	I. & II.	72·0	21·17	Unchambered		30	30	F.M.	1¾ R.L.G[2]	..	..	3·0	9·1	→ 8 12/16	0·996	0·335	1330	119	298	..	..	..
	9-pr.	6 cwt.	I.	61·0	17·67	,,		30	30	F.M.	1½ R.L.G.[2]	..	..	3·0					1250	·97	323			
	9-pr.	6 cwt.	II. III. IV.	74·5 74·875	22·0	,,		30	30	F.M.	1¾ R.L.G.[2] 1½ R.L.G.[2]	.. ..	.. ..	2·94	9·1		0·956	0·356	1390	119	397	..	..	..
	2·5-in.	400 lbs.	I. L.¶	70·45	26·6	2·56	11·07	80	30	P.	1½ R.L.G.[2]	..	..	2·5	7·63	4·5/16	0·819	0·488	1440	101	377	..	..	..
	7-pr.	200 lbs.	IV.	41·0	12·0	Unchambered		20	20	F.	¾ R.F.G.	..	..	2·94	7·29	→ 7·25/16 14·5/16	1·185	0·287	950	46	515	..	..	..
R.B.L. GUNS (screw).	7-in.	82 cwt.	..	120·0	14·21	7·2	16·0	37	37	P.	11 R.L.G.[2]	..	..	7·0	91·25	8 4/16	0·537	0·266	1100	909	222	..	..	..
	40-pr.	35&32cwt.	..	121·0 & 120	22·39	4·96	13·5	36½	36½	P.	5 R.L.G.[2]	..	..	4·75	40·7	2 6/16	0·554	0·380	1160	380	217	..	..	..
	20-pr.	15&13cwt.	..	66·125	14·43	3·94	11·0	38	38	P.	2½ R.L.G.[2]			3·75	21·8	1 5/16	0·645	0·414	1100	183	244	..	..	..
	12-pr.	8 cwt.	..	72·0	20·458	3·2	8·5	38	38	P.	1½ R.L.G.[2]			3·0	11·25	8/16	0·800	0·417	1239	200	299	..	..	..
	9-pr.	6 cwt.	..	62·0	17·5	3·2	7·0	38	38	P.	1⅛ R.L.G.[2]	..	..	3·0	8.56	6/16	1·052	0·317	1055	66	220	..	..	..
	6-pr.	3 cwt.	..	60·125	21·2	2·625	7·0	30	30	P.	¾ R.L.G.[2]			2·5	5·46	..	1·145	0·350	1046	41	273			
QUICK-FIRING GUNS											lbs. oz.													
6·0 in.		7 tons	I. & III. II. (Wire)	7 tons	40	..	..	..	..	..	29¾ E.X.E.	13 4	30/14	..	100·0	..	0·360	0·463	1882 2200	2457 3356	351 479	12·0 16·1a	10·1 10·9	8·5 9·3
4·7 in.		cwt. ,,	I. II. III. & IV. Wire	194·1	40	..	..	100	34·4	E.O.C.	12 0 S.P.	5 7	20/14	4·72	45·0	..	0·495	0·428	1786 2188	995·4 1494	485·7 711	8·6 11·9a	6·0 7·8	4·6 6·2
4 in.		24 cwt.	I. Wire	..	40	..	...	..	..	..	..	3 14	15/14	..	25·0	..	0·640	0·390	2456	1046	654	11·2a	7·2	5·4
12-pr.		12 cwt.	I.	108·6	40	..	..	..	..	..	..	1 10	10/11	3·0	12·5	..	0·667	0·500	2200	423	677	8·1 a	5·2	3·8
12-pr. §§		8 cwt.	I.	87·6	28	..	..	..	..	..	..	13½	10/11	3·0	12·5	..	0·667	0·500	1584	218	544	5·0	..	..
Hotchkiss . 6-pr...		8 cwt.	I. & II.	97·63	40·0	..	..	180	29·9	P.Pl.	1 15 Q.F.	7¾	5/11	2·24	6·0	..	0·836	0·534	1818	137·5	344·8	3·7	2·4	Mild steel.
Nordenfelt . 6-pr...		6 cwt.	I. II. & III.	104·4	42·3	..	..				1 15 Q.F.													
Hotchkiss . 3-pr...		5 cwt.	I. & II.	80·63	40	..	..	25	25	..	1 8 Q.F.	6⅜	5/11	1·85	3·3	..	1·037	0·521	1873	80·3	321·2	3·1	1·8	
Nordenfelt . 3-pr...		4 cw.	I.	..	45·4									..	..	..	..	..	..	..	..	..	1·9	
MACHINE GUNS.											grains.				oz. grs.									
Nordenfelt, 2 bar. 1-in.		180 lbs.	I.	52·75		..	..	35	35	H.	625 M.G.	..	..	1·0	7¼ 0	..	2 207	0 453	..	..	..	¾-in. at 200 yards.		
,, 4 bar 1-in.		447 lbs.	III.**	57·0		..	..	35	35	H.														
,, 5 bar 0·45-in.		143 lbs.	II. G. G.	42·25		..	..	22	22	H.														
Gardner, 1 bar 0·45-in.		76 lbs.	G. G.	47·0		..	..	22	22	H.	85 R.F.G.$_2$	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as MH.Rifle, which perforates ⅛ in. wrought iron plate at 600 yds., 3/16 in. at 400 yds., ¼ in. at 100 yds.		
,, 2 bar 0·45-in.		218 lbs.	..	47·0		..	..	22	22	H.														
,, 5 bar 0·45 in.		290 lbs.	I. G. G.	53·5		..	..	22	22	H.														
Gatling, 10 bar 0·65 in.		817 lbs.	..	66·5		..	..	30	30	H.	270 R.F.G.$_2$	..	..	0·65	1422	..	2·109	0·730	..	..	..	Not known.		
,, 10 bar 0·45-in.		444 lbs.	G. G.	59·41		..	..	22	22	H.														
,, (Acclesfeed)		266 lbs.	G. G.	51·0		..	..	22	22	H.	85 R.F.G.$_2$	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as MH.Rifle		
Maxim, 1 bar 0·45 in.		63 lbs.	G. G.	43·6		..	..	22	22	H.														

L., Land-service only, but might concern navy when serving on land. The Roman numeral is the number of the pattern given.

* Further differences in pattern indicated by letters A, B, and C. † P. means Polygroove; Pl., Plain; W., Woolwich; F., French; F.M., French modified; H., Henry. ‡ S.B.C. (in column for charge) means Slow-burning Cocoa; P.Bl. stands for Prismatic Black; P.Br. for Prismatic Brown; Pb., Pebble; R.L.G., Rifle Large Grain; L.G., Large Grain; E.X.E., Experimental letter E. § For the higher natures the weight of projectile given is for Palliser shot; for the lower natures it is for filled common shell. ‖ For high-angle fire. ¶ Mountain-service jointed gun.

** I. and II. differ chiefly in being 7 lbs. lighter; I. has a pitch of rifling of 1 in 60 in.; G.G., Gardner Gatling; H., Henry.

→ Studded projectiles. ‡‡ Forged steel shells. §§ There is a 6-cwt. 12-pr. Wire Gun for land service. *a* By Krupp's formula.

AUSTRIAN NAVAL ORDNANCE.

	Krupp Steel B.L. Guns.											Uchatius. St., Br.						Cast Iron BL.
Designation by Calibre, in centimètres	30·5 L. 35 C. 80	26 L. 22	24 L. 35 C. 86	24 L. 22	21 L. 20	15 L. 35 C. 86	15 L. 35 C. 80	15 L. 26	15 L. 26	12 L. 35 C. 80	12 L. 35 C. 87	15 L. 25	15 L. 37	12 L. 35	9 L. 24	7 L. 15	15 L. 21
Calibre, in inches	12·01	10·24	9·45	9·27	8·24	5·87	5·87	5·87	5·87	4·72	4·72	5·87	4·72	4·72	3·43	2·60	5·87
Length — Total, in Feet	35·11	18·77	27·60	17·16	13·73	17·13	17·13	12·63	12·63	13·8	13·8	12·19	14·38	13·97	6·76	3·28	10·13
Length — Rifled Portion, in inches	314·8	148·4	233·2	135·9	105·0	151·4	149·6	105·7	111·6	128·5	126·3	111·4	123·2	123·8	57·5	23·8	89·8
Length — Powder Chamber ,,	69·9	46·1	69·3	41·7	37·0	37·8	35·4	29·3	23·4	24·0	26·3	23·6	36·6	31·65	16·5	11·0	18·0
Length — Of bore in calibres	35	19·0	35	22·0	20·0	35	35·0	25·8	25·8	35·0	35	24·9	37	35·0	23·7	15·0	18·4
No. of Grooves	68	32	25	32	30	36	36	24	36	32	32	36	32	32	24	18	30
Twist in calibres	..	70	26·9	70	59	45—25	25	68·4	45	25	25	45	45—25	25	45	30	63·2
Weight — Gun, tons	47·8	21·7	26·5	14·5	8·68	5·7	4·69	3·94	3·94	2·25	2·46	3·35	3·2	2·85	0·479	0·09	2·81
Weight — Breech Block, in lbs.	..	1951	..	1422	1080	445·3	..	321·9	321·9	..	..	209·4	..	211·6	55·1	18·7	176·4
Weight — Steel Shell ,,	1003·1	395·7	474·0	292·1	206·6	112·5	86·0	72·8	84·9	57·3	57·3	84·9	57·3	57·3	..	..	..
Weight — Chilled Shell ,,	..	..	..	..	196·2	..	..	..	..	..	..	..	..	..	..	..	..
Weight — Common Shell ,,	1003·1	354·2	474·0	263·5	172·0	112·5	69·9	67·2/65·5	69·4	57·3	57·3	69·45	57·3	57·3	14·02/14·22	6·42	6·11
Weight — Shrapnel Shell ,,	..	..	..	..	..	112·4	71·9	67·2/65·5	69·4	57·3	57·3	69·45	57·3	57·3	15·76	6·88	6·79
Weight — Case Shot ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	16·53	6·94	38·4
Weight of Bursting Charge — Steel Shell ,,	10·6	8·8	5·1	6·6	4·4	1·3	1·76	1·65	2·09	0·55	0·55	2·09	0·53	0·55	..	..	..
Weight of Bursting Charge — Chilled Shell ,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Weight of Bursting Charge — Common Shell ,,	35·7	20·3	17·9	15·0	15·0	5·29	3·86	3·86	5·07	2 2	2·2	5·07	2·20	2·21	0·46	0·18	1·87
Weight of Bursting Charge — Shrapnel Shell † in lbs.	..	..	..	..	..	1·26	1·10	1·08	1·08	0·57	0·57	1·08	0·57	0·57	0·20	0·09	0·90
Weight of Firing Charge — Steel and Chilled Projectile, in lbs.	308·6	89·3 B	..	76·1	50·7 C	39·0	38·8	21·6 C	20·9 C	19·8 B	17·0	20·9 C	30·0 B	19·8 B	..	..	..
Weight of Firing Charge — Common Shell, in lbs.	308·6	59·5	..	44·1	30·9	39·0	38·8	14·3/21·6	20·9 C	19·8 B	17·0	20·9 C	30·0 B	19·8 B	3·31/0·97	0·77 O/0·35	4·74
Weight of Firing Charge — Exercising, in lbs.	154·3	59·5	..	44·1	30·9	28·7	19·6	21·6 C	20·9 C	11·0	..	20·9 C	19·8 B	12·13 B	3·31	0·77 O/0·35	4·74
Weight of Firing Charge — Saluting ,,	19·8	19·8 O	..	15·4 O	8·82 O	4·74	4·74 O	4·74 O	4·74 O	2·4	2·4	4·74 O	2·4	2·4	0·88 O	0·35	4·74
Muzzle Velocity, in feet	1755·3	1575	..	1587	1519	1962	1969	1641	1562	1755	1969	1562	1755	1755	1470	978	1017
Muzzle Energy — Total, foot-tons	21,420	6808	..	5104	3306	3000	2312	1358	1435	1215	1541	1435	1224	1224	..	..	..
Muzzle Energy — Per inch circumference, foot-tons	567·8	211·6	..	175·3	127·7	162·8	125·4	73·7	77·9	82·5	104·0	77·9	82·45	82·45	..	..	..
Thickness of Iron, perforated inches at Muzzle	24·8	15·0	..	13·7	11·6	13·4	11·7	8·8	9·1	9·4	10 5	9·1	9·45	9·45	..	..	..

NOTE.—P stands for pebble powder; C for cube powder; * prismatic powder; O ordinary powder (inferior); B brown prismatic. † Generally steel.

DANISH NAVAL ORDNANCE.

	Krupp B.L. Guns designated.											Armstrong M.L.					Finspong.
Designation by Calibre	35·5 cm.	30·5 cm.	26 cm. long.	26 cm. short.	21 cm.	15 cm. long.	15 cm. medium.	15 cm. short.	12 cm. long.	12 cm. short.	8·6 cm.	10 in.	10 in.	10 in.	9 in.	8 in.†	6 in.
Calibre, in inches	13·98	12·01	10·24	10·24	8·24	5·91	5·91	5·91	4·72	4·72	3·43	10·0	10 in.	10 in.	9·0	8·0	6·04
Total length, in feet	29·1	22·0	32·8	18·77	24·04	17·1	12·63	10·7	11·8	9·6	6·9	17·0	14·5	14·0	13·0	10·8	9·5
Length of Bore, including Powder Chamber { in inches	304·7	227·2	327·6	194·5	264·5	190·3	135·0	112·9	128·8	102·4	73·6	175·5	145·5	140·0	125·0	104·2	100·8
Length of Bore, including Powder Chamber { in calibres	21·8	18·9	32·0	19·0	35	32·2	22·8	19·1	27·3	21·7	21·3	17·5	14·55	14·0	13·3	13·1	16·7
Number of Grooves	80	68	60	60	48	36	36	36	32	32	24	7	7	7	6	6	6
Twist of Rifling, in calibres	45	45	70–25	45	70–25	70–25	45	45	25	40	45	40	40	40	40	50	40
Total weight, including Breech-gear, tons	51·3	35·4	27·6	21·6	13·3	4·7	4·4	3·5	2·13	1·39	0·49	20·0	18·5	18·0	12·5	8·65	2·46
Weight of { Breech Block, lbs.	4695·8	2910	2006	1940	903·9	390·2	330·7	324·1	229·2	176·4	101·4	..	..	..	..	..	..
Weight of { Steel Shell, "	1157·4	725·3	451·9	451·9	238·1	112·4	..	86·0	..	44·1	..	400	400	400	..	..	..
Weight of { Chilled Shell, "	1157·4	725·3	..	451·9	..	..	86·0	86·0	..	44·1	..	400	400	400	250·2	165·3	..
Weight of { Common Shell, "	1157·4	725·3	451·9	451·9	238·1	112·4	69·4	69·4	57·3	36·2	15·2	400	400	400	250·2	131·2	55·1
Weight of { Shrapnel Shell, "	1157·4	725·3	451·9	451·9	238·1	112·4	86·0	86·0	57·3	44·1	..	..	..	..	..	..	15·4
Weight of { Case Shot, "	..	..	..	..	..	..	..	..	..	..	..	191·8	..	..	154·3	127·9	58·4
Weight of Bursting Charge { Common Shell, "	57·3	39·7	25·4	25·4	12·8	6·2	3·0	3·0	1·7	1·4	0·44	26·5	26·5	26·5	18·5	7·5	5·0
Weight of Firing Charge { Steel or Chilled Shell, lbs.	330·7	180·2	191·8	101·4	105·8	41·9	19·3	21·8	17·4	8·8	..	71·7	71·7	71·7	44·1	29·8	..
Weight of Firing Charge { Common Shell, "	330·7	180·2	191·8	112·4	105·8	41·9	19·3	21·8	17·4	8·8	3·3	71·7	71·7	71·7	44·1	19·8	60·6
Muzzle Velocity { Armour-piercing Projectile, feet	1762	1675	2018	1640	2021	1800	1565	1542	..	1416	..	1457	1368	1368	1368	1378	..
Muzzle Velocity { Common Shell, "	1762	1675	2018	1640	2021	1890	1683	1690	1720	1549	1457	1457	1368	1368	1368	1320	1076
Muzzle Energy { Total foot-tons	24910	14110	12770	8428	6745	2784	1461	1418	..	6130	..	5889	5192	5192	3246	2177	..
Muzzle Energy { Per inch circumference, foot tons	568·3	374·1	396·8	262·0	260·6	150·0	78·7	73·0	..	32·8	..	189·0	165·3	165·3	115·8	86·9	..
Perforation at Muzzle, in inches	24·8	20·0	23·4	16·7	16·9	12·8	9·1	8·8	..	5·8	..	14·1	13·1	13·1	10·9	9·5	..

Note.—Chilled projectiles will gradually be replaced by steel.

† There is another Armstrong gun differing very little from this one.

DUTCH NAVAL ORDNANCE.

	Krupp Breech Loading.							Armstrong Muzzle Loading.			Dutch Breech Loading.		
Designation by Calibre, in centimètres	28	21	17	15 No. 1.	No. 2.	12 No. 1.	12	28	23	18	12 No. 2.	12*l*	7·5
Calibre, in inches	11·02	7·91	6·80	5·87	5·87	4·72	4·72	11·00	9·00	7·00	4·72	4·72	2·95
Total Length, in feet	20·01	24·04	13·94	12·63	17·13	6·89	13·78	14·42	13·00	11·00	6·89	13·78	7·87
Length of Rifled Portion of bore, in inches	170·8	222·2	112·7	111·8	151·4	61·4	128·5	119·0	104·0	95·5	61·4	..	43·2
Length of Powder Chamber "	36·4	42·4	36·0	23·2	37·7	13·0	24·0	26·0	21·9	15·5	13·0	..	6·7
Length of bore, in Calibres	18·8	35	21·9	23·0	35	15·8	35	12·1	14·0	15·9	15·8	35	17·5
Number of Grooves	64	48/64	42	36	44	12	32	9	6	3	12	32	20
Depth of Grooves, inches	0·069	0·059	0·118	0·118	..	0·049	..	0·20	0·18	0·18	0·118	0·06	0·049
Twist of Rifling in Calibres	45	∝ 25	45	40	25	40	25	∝ 45	∝ 45	35	40	∝ 45	∝ 30
Total Weight, in tons	27·21	12·79/13·98	5·51	3·94	4·72	0·79	2·26	24·46	12·50	7·17	0·93	2·31	0·21
Firing Charge: Armour-piercing Projectile, in lbs.	121·3	99·2	27·6	20·9	49·6	..	19·8	86·0	50·7	30·0	..	19·5	..
Firing Charge: Common Shell "	121·3	99·2	27·6	20·9	49·6	2·43	19·8	86·0	50·7	13·9	2·43	19·8	0·82
Weight: Armour-piercing Projectile "	560·0	308·6	132·3	86·0	112·2	41·0	57·3	533·5	249·1	114·6	..	57·3	..
Weight: Common Shell "	476·2	308·6	112·4	69·4	112·2	29·5	57·3	535·7	262·4	116·8	29·5	57·3	9·5
Weight: Case Shot "	273·4	..	63·9	41·9	..	26·5	57·3	185·2	149·9	68·3	26·5	..	9·3
Bursting Charge: Armour-piercing Projectile "	6·6	4·6	2·2	1·1	..	0·44	..	4·4	2·2	2·2	..	..	..
Bursting Charge: Common Shell "	26·5	12·3	6·6	6·6	..	2·0	..	28·7	17·6	8·8	1.8	..	0·44
Muzzle Velocity, feet	1558	1739	1558	1558	2001	971	1755	1332	1476	1558	951	1804	958
Muzzle Energy: Total, in foot-tons	9423	6471	2226	1447	3115	..	1224	6563	3763	1929	..	1264	..
Muzzle Energy: Per inch Circumference, foot-tons	272	260·7	104	84	169·0	..	82·5	191	134	89	..	85·2	..
Perforation at Muzzle, in inches	17·0	16·8	10·5	9·1	13·6	..	9·4	14·0	11·9	9·7	..	9·6	..
Metal employed or system of construction	Steel Jacket and Hoops.		Steel-hooped.		Steel Jacket and Hoops.	Steel-hooped.	Steel Jacket and Hoops.	Steel Tube and Wrought Iron.			Bronze.		

NOTE.—The 23-cm. ML. guns also discharge 113-Kg. steel shells and 113-Kg. solid shot. The 18-cm. ML. guns discharge steel shells of 51-Kg. and segment shells of 53-Kg. The 7·5-cm. BL. guns discharge ring-shells of 4·3 Kg. Of the older guns there are yet extant three sorts—rifled 16-cm. muzzle-loader (mostly bronze), rifled bronze 7-cm. and 5-cm.

FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun.	Model 1887.					1870–81.	70–81. 70–84.	1884.					1881.										
Desig. by Calibre, in cms.	34	30	27	24	19	27	32	34	27	24	16	14	34 long.	34 short.	27	24	16 heavy.	16 light.	14	10	mm. 90	mm. 65
Calibre, in inches	13·39	11·81	10·80	9·45	7·64	10·80	12·6	13·39	10·80	9·45	6·49	5·45	13·39	13·39	10·8	9·45	6·49	6·49	5·46	3·94	3·54	2·57
Total length, in feet	..	..	..	..	..	23·97	27·93	..	28·47	24·89	17·04	..	33·69	25·32	27·12	23·70	15·14	15·14	14·3	8·6	7·1	3·58
Length of Bore, in inches	..	..	..	..	..	269·0	313·8	..	..	..	..	..	380·6	280·2	306 9	269·3	180·9	180·9	162·6	102·6	77·9	41·2
Length of Bore, in calibres	42	45	45	42	45	25	26·6	30	30	30	30	30	28·5	21·0	28·5	28·5	28	28	28	26	22	16
Number of Grooves	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	50	50	42	30	28	20
Depth of Grooves, inches	..	..	..	..	..	0·059	0·059	..	..	..	..	..	0·067	0·067	0·059	0·055	0·039	0·039	0·035	0·028	0·024	0·020
Rifling Twist	..	..	..	..	..	7°	7°	..	..	..	..	..	7°	7°	7°	7°	7°	7°	7°	7°	7°	8°
Total weight, in tons	75·78	44·3	34·1	21·26	13 8	24·6	42·3	50·8	27·7	17·9	5·4	3·15	52·2	47·2	27·4	17·7	4·9	3·9	3·2	1·18	0·54	0·09
Weight of Firing Charge: Armour-piercing Projectile lbs.	440·9	..	200·6	104·7	39·7	154·3	282·2 / 249·1	388·0	200·6	..	42·5	..	388·0	337·3	203·9	149·9	42·5	32·6	..	..	..	..
Weight of Firing Charge: Common Shell „	440·9	..	..	..	..	154·3	282·2 / 249·1	..	200·6	..	42·5	27·1	337·3	368·2	203·9	149·9	42·5	32·6	27·1	9·9	3·6	0·79
Weight: Armour-piercing Projectile * lbs.	881·8	626·1	476·2	317·5	165·3	476·2	760·6	925·9	476·2	317·5	99·2	..	925·9	925·9	476·2	317·5	99·2	99·2	..	..	..	..
Weight: Common Shell „	881·8	..	..	..	..	396·8	630·5	771·6	396·8	264·6	99·2	66·1	771·6	771·6	396·8	264·6	99·2	99·2	66·1	30·9	17·6	5·95
Weight: Case Shot „	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	130·7	130·7	61·7	39·0	19·5	7·7
Muzzle Velocity, in ft.-sec.	2625	2625	1969	2297	2625	1887	1985 / 1804	1969	1969	1969	1969	1969	1969	1804	1969	1969	1969	1821	1936	1673	1493	1135
Muzzle Energy: Total, in foot-tons	42139	29910	12800	11620	7894	11760	20780 / 17160	24900	12800	8539	2668	1777	24900	20880	12800	8539	2668	2080	..	..	..	..
Muzzle Energy: Per in. circ., foot-tons	1002	770·0	377·5	391·4	329·0	346·6	525·0 / 433·5	591·9	377·5	287·7	130·8	103·9	591·9	496·6	377·5	287·7	130·9	121·3	..	..	..	..
Perforation at Muzzle, inches	33·2	29·1	20·4	20·7	19·0	19·5	24·0 / 21·7	25·5	20·4	17·8	12·0	10·7	25·5	23·2	20·4	17·8	12·0	11·5	..	..	..	..
„ „ „	38·9‡	35·7‡	21·1‡	23·2	22·7‡	..	..	26·6‡	21·1‡	18·4‡	12·4‡	..	26·6	..	21·1‡	18·4‡	..	..	..	..	..	..

NOTE.—Q.F. guns are now ordered to me made for several vessels. See p. 329.

* Steel or chilled iron.

‡ By Krupp's formula.

FRENCH NAVAL ORDNANCE—*continued.*

Date and Pattern of Gun.	75–79.	Jacketed. 1870.		Jacketed. 70–75	Jacketed. 75	1875.				1870.				
Desig. by Calibre, in cms.	37	27	14	27 No. 1	10	42†	34	27 No. 1	10	27	24	19 long.	16	14
Calibre, in inches	14·57	10·79	5·46	10·8	3 94	16·54	13·39	10·8	3·91	10·8	9·45	7·64	6·49	5·46
Total length, in feet	36·7	17·7	10·3	19·3	9·3	32·5	22	19·3	9·3	17·7	16·21	13·6	12·2	10·3
Length of Bore, in inches	414·0	194·3	115·0	213·4	104·3	366·0	241·5	213·4	104·3	194·3	179·1	151·0	137·3	115·0
Length of Bore, in calibres	28·5	18	21	19·7	26	22	18	19·8	26	18·0	19	19·7	19	21
Number of Grooves	..	54	28	54	20	84	68	54	20	54	48	28	50	28
Depth of Grooves, inches	0·079	0·059	0·047	0·059	0·032	0·079	0·059	0·059	0·032	0·059	0·059	0·059	0·039	0·047
Rifling Twist	7°	4°	4°	4°	7°	7°	4°	4°	7°	4°	4°	4°	7°	4°
Total weight, in tons	75·1	22·8	2·6	27·9	1·18	74·8	47·6	27·6	1·18	22·8	15·4	7·9	4·92	2·66
Weight of Firing Charge: Armour-piercing Projectile* . lbs.	463	136·7	..	165·3	..	604·1	257·9	136·7	..	92·6	62·8	33·1	39·7	..
Weight of Firing Charge: Common Shell "	463	126·8	11·2	145·5	10·1	..	231·5	121·3	7·1	92·6	62·8	33·1	39·7	9·0
Weight: Armour-piercing Projectile . lbs.	1235	476·2	..	476·2	..	1719·6	925·9	476·2	..	476·2	317·5	165·3	99·2	..
Weight: Common Shell "	1014	396·8	61.7	396·8	30·9	1433·0	771·6	396·8	26·3	396·8	264·6	137·8	99·2	46·3
Weight: Case Shot "	..	321·9	42·8	321·9	18·7	..	..	321·9	18·7	321·9	211·6	..	68·3	39·7
Muzzle Velocity, in ft.-sec.	1969	1608	1529	1640	1673	1663	1595	1641	1591	1424	1444	1470	1782	1332
Muzzle Energy: Total, in foot-tons	33210	8515	..	8880	..	17750	16320	8865	..	6695	4592	2477	2183	..
Muzzle Energy: Per in. circ., foot-tons	725·4	251	..	261·7	..	422	388	261	..	197·3	154·7	103·2	107	..
Perforation at Muzzle, inches	28·2	16·4	..	16·7	..	21·3	20·3	16·7	..	20·53	20·3	10·4	10·8	..

* Steel or chilled iron.

† There is also a 42-cm. gun of 20·35 calibres length, in 2 pieces.

GERMAN NAVAL ORDNANCE.

		Krupp Steel Breech-loading Guns, designated by calibre.																							Bronze B.L.
Designation in centimètres		30·5 jack'd.	28	28	26 long.	26 jack'd.	26 short.	24 long.	24 short.	21 long.	21 long.	21 short.	21 short.	17 long.	17 short.	15 long.	15 short jack'd.	15 short.	15 short.	15 short jack'd.	12·5 hoop'd.	12 hoop'd.	10·5 long.	8·7	8	8
Calibre, in inches		12·01	11·02	11·02	10·33	10·33	10·33	9·45	9·37	8·24	8·24	8·24	8·24	6·80	6·80	5·87	5·87	5·87	5·87	5·87	4·92	4·74	3·96	3·43	3·09	3·19
Length	Total, in feet	21·98	36·75	32 15	18·77	18·77	17·06	23·63	15·45	24·0	20·61	15·45	12·88	13·94	11·32	14·67	10·73	10·73	10·73	10·68	9·60	9·6	12·08	6·89	6·89	5·15
	Rifled portion, in ins.	181·9	§407·9	§352·8	149·8	150·0	129·3	201·6	116·2	218·2	176·5	124·6	114·9	117·1	102·2	128·5	93·3	87·1	86·7	87·1	85·7	85·3	113·6	62·7	57·6	45·9
	Powder Chamber†, „	45·3			44·7	44·4	44·7	53·5	40·9	75·3	46·7	37·1	34·0	31·5	16·7	31·1	19·0	25·1	25·5	25·1	16·7	16·7	19·5	10·7	10·5	9·73
	Bore, in calibres	18·9	40	35	18·8	18·8	16·8	26·1	16·8	35·6	27·1	19·6	18·1	21·9	17·5	27·2	19·1	19·1	19·1	19·1	20·8	21·6	33·6	21·4	22·0	17·4
Number of Grooves		72	..	..	36	48	36	56	48	48	48	30	30	30	30	36	36	36	24	36	32	18	32	24	12	12
Depth of Grooves, in inches		0·079	..	..	0·077	0·079	0·077	0·059	0·061	0·059	0·059	0·102	0·102	0·063	0·063	0·059	0·061	0·061	0·061	0·061	0·059	0·051	0·049	0·049	0·049	0·051
Twist, in calibres		45	..	..	50	50	50	25*	45	25*	25*	68	59	45	45*	25*	45	45	68	50	40*	60	25*	40*	46	46
Weight	Gun, including Breech Gear, tons	35·4	43·4	43·2	21·7	18·7	17·7	18·7	14·6	13·03	12·3	9·84	8·86	5·51	3·40	4·04	3·44	3·44	3·44	3·15	1·38	1·35	1·15	0·44	0·32	0·23
	Breech Block, in lbs.	2954	..	..	2050	1973	1973	..	1378	831·1	908·3	831·1	831·1	496·0	414·5	390·2	324·1	324·1	324·1	324·1	163·1	163·1	149·9	86·0	63·9	55·1
	Armour-piercing projectile,‡ in lbs.	725·3	562·2	562·2	412·3	412·3	412·3	474·0	306·4	308·6	308·6	217·2	217·2	117·9	117·9	112·4	76·1	76·1	76·1	76·1	..	..	..	..	..	..
	Common Shell, in lbs.	725·3	474·0	474·0	357·1	357·1	357·1	474·0	261·5	308·6	308·6	174·2	174·2	112·9	112·9	112·4	65·0	65·0	65·0	65·0	40·1	33·1	39·7	14·9	9·4	8·3
Weight of Bursting Charge	Armour-piercing Shell, in lbs.	7·7	..	..	5·3	5·3	5·3	6·6	3·2	5·5	5·5	2·8	2·8	1·3	1·3	1·5	0·8	0·8	0·8	0·8	..	..	..	..	..	..
	Common Shell, in lbs.	19·8	25·4	25·4	14·3	14·3	22·0	15·4	15·4	12·1	12·1	6·6	6·6	5·1	5·1	4·3	4·2	4·2	4·2	4·2	2·4	2·5	0·9	0·4	0·4	0·6
Weight of Firing Charge	Armour-piercing Shell, in lbs.	202·8	352·7	297·6	105·8	105·8	125·7	152·1	67·2	103·6	103·6	41·9	35·3	30·9	16·5	33·1	14·3	17·1	13·2	17·1	..	..	..	..	..	..
	Common Shell, in lbs.	202·8	352·7	297·6	105·8	105·8	125·7	152.1	50·7	103·6	103·6	41·9	35·3	30·9	16·5	33·1	14·3	17·1	12·1	17·1	8·8	4·6	8·8	3·3	1·1	0·9
Initial Velocity	Armour-piercing projectile, ft.-sec.	1713	2362	2133	1588	1588	1578	1657	1493	1739	1657	1463	1316	1608	1326	1624	1463	1463	1358	1463	..	...	..	..	..	..
	Common shell, ft.-sec.	1713	..	..	1641	1641	1654	1657	1391	1739	1657	1394	1276	1654	1342	1624	1555	1555	1447	1555	1545	1280	1526	1545	1148	1053
Muzzle Energy	Total, foot-tons	14,750	21,750	17,740	7211	7211	7119	9024	4736	6471	5876	3225	2606	2112	1436	2055	1131	1131	974	1131	..	..	..	..	..	..
	Per in. circ., ft.-tons	391	628·4	512·4	223	223	220	304	161	250·0	227	125	101	98·9	67·3	111·5	61·3	61·3	52·8	61·3	..	..	..	..	..	..
Perforation at Muzzle, in ins.		20·5	‖30·7	‖26·3	15·4	15·4	15·3	18·1	13·0	16·4	15·6	11·4	10·1	10·3	8·3	11·0	8·0	8·0	7·4	8·0	..	..	..	..	..	..

NOTE.—There are also quick-fire guns; see Table of Krupp Q.F. guns. The 30·5, 26, and 24-cm. guns fire steel armour-piercing projectiles.

* Maximum twist. † Including taper entrance into bore. ‡ In most cases steel shells. § Length including powder chamber. ‖ Iron by Krupp's formula.

ITALIAN NAVAL ORDNANCE.

	Armstrong Breech Loading.				B.L.	Armstrong Muzzle Loading.							Muzzle Loading. Old Pattern.		Breech Loading.		Armstrong Quick Firing.			
Designation by Calibre, in centimètres	43·1‡ New Pattern.	43·1‡ Early Pattern. 1882.	34·3	12·0	12·0	45·0	27·9 New Pattern.	25·4 No. 1 Long.	25·4 No. 2 Short	25·4 No. 2.	22·8	20·3	16	16	7·5 No. 1.	7·5 No. 2.	15·2†	14·9	12·0*	12·0§
Calibre, in inches	17	17	13·5	4·72	4·72	17·72	11	10	10	10	9	8	6·5	6·5	3	3	6·0	5·87	4·7	4·7
Length: Total, in feet	40·75	39	36·09	8·5	9·25	32·7	14·4	14·4	14	13·8	13·8	10·8	11·8	10·6	5·8	3·3	13·8	13·87	16·2	13·0
Length: Rifled Bore, in inches	346·8	315·7	..	75	88	302	121	120	114	112	106	89	96	87	52	27	126	..	} 189	..
Length: Powder Chamber, in inches	84·5	98	..	10·8	22	56·5	24·5	26·0	26·0	14·0	19·5	15·7	21·3	21·3	10·2	7·9	28	..		..
Length: Bore, in Calibres	27	26	..	20·2	23·5	20·5	13·2	14·6	14·0	12·6	13·9	13·1	16·8	15·5	20·7	11·7	26	..	40	35
No. of Grooves	82	82	56	37	36	28	9	7	7	8	6	6	6	6	12	12	28	28	22	22
Twist of Rifling, in Calibres	50	50	..	40	42	50	35	40	40	55	45	45	42·5	27·3	48	48	40	40	34·4	..
Total Weight, in tons	104·3	101·5	67·9	1·20	1·38	100	25·0	18·0	18·1	12·1	12·6	6·99	5·12	3·54	0·29	0·095	4	4·2	2·05	1·69
Firing Charge: Armour-piercing projectile, lbs.	900·0	725	630·5	5·5	9·9	551	95·2	77·6		63·9	59·7	37·7	19·8	..	..	..	39·7	26·5	12·0	..
Firing Charge: Common Shell, "	600	480	..	5·5	9·9	63·0	66·6	52·9		41·9	37·7	26·7	7·3	7·1	1·9	0·7	26·5	40	12·0	..
Weight: Armour-piercing projectile, "	2000	2000	1250	52·0	52·2	2000	540·1	451·9		331·8	315·3	191·8	103·6	..	..	..	80		45·0	36·0
Weight: Common Shell, "	2000	2000	1250	31·7	36·8	2000	526·9	399·0		284·4	250·0	180·0	64·6	65·7	9·4	9·4	80	about 80·0	..	36·2
Weight: Shrapnel " "	2017	2017	1250	37·3	37·37	2180	533·5	399·0		284·4	250·0	180·0	68·3	..	9·4	9·4	80		..	29·8
Weight: Case Shot "	..	..	..	32·4	35·9	..	200·1	188·1		135·6	99·6	79·4	33·1	33·1	9·0	9·0	70	..	..	..
Bursting Charge: Armour-piercing projectile, "	32	32	17·4	2·31	2·31	32 ?	15·0	12·3		8·4	6·5	3·8	..	..	..	..	1·5	..	..	1·83
Bursting Charge: Common Shell, "	60	60	87·1	2·2	2·2	78 ?	26·0	23·8		18·2	18·8	9·7	2·87	2·87	0·31	0·31	5	..	..	3·02
Bursting Charge: Shrapnel " "	5	5	4·25	0·35	0·35	5 ?	2·2	2·20		1·96	1·80	1·17	0·55	..	0·03	0·03	0·16	..	..	0·35
Muzzle Velocity, in feet	1992	1935	2016	1345	1591	1700	1353	1388		1373	1284	1311	1290	1024	1335	..	1946	..	1786	..
Muzzle Energy: Total, foot-tons	55,030	51,930	35,230	650·4	916·4	40,060	6857	6035		4369	3604	2286	1195	..	..	..	2100	..	995·4	..
Muzzle Energy: Per inch circumference, foot-tons	1035	976·3	830·8	43·9	61·8	753·4	198·5	192·2		139·1	127·6	91·0	58·5	..	..	..	114·1	..	67·1	..
Perforation at Muzzle, inches of iron	33·7	32·8	30·2	6·7	8·1	28·5	14·3	14·1		12·0	11·4	9·6	7·7	..	..	..	11·2	..	8·6	..
Metal employed in structure	St.	I. & St.		St.	St.	Steel tube in Wrought Iron jacket.							I. & St.	Cast I.	Br.	Br.			St.	

St. stands for steel, I. for iron, Br. for Bronze.

* For Piemonte. † For Piemonte, Fieramosca, Re Umberto, Ancona, Doria.

‡ There are four types of these bores, viz.: types Lauria, Lepanto, Italia, Valente. § For Duilio, Dandolo, Formidabile.

	Obuchoff Steel Breech Loading Hooped Guns.																Steel B.L. Guns.		
Designation by Calibre, in inches	12	12 Long.	12 M. 77.	11 M. 67.	11 Pattern 77.	9	9 M. 67.	9	8	8	8 M. 67.	6	6 Long.	6·03	6	Long 9-pdr.	4·2 (9-pdr.)	3·43 Long (4-pdr.)	3·43 (4-pdr.)
Calibre in centimètres	30·48	30·48	30·48	27·94	27·94	22·86	22·86	22·86	20·32	20·32	20·32	15·24	15·24	15·32	15·24	10·67	10·67	8·70	8·70
Total Length, in feet	**35	30	20	18·3	20·0	**26·25	15·0	13	**23·33	**20	14·6	**17·5	14	12·2	11·7	6·9	7·0	6·9	5·8
Length of Rifled Portion of Bore, in inches	..	..	165·0	152·0	158·0	..	124·0	..	..	..	128·0	..	118·7	106·0	98·0	61·5	65·0	62·6	53·0
Length of Powder Chamber, in inches	..	..	38·5	35·0	50·4	..	28·5	..	..	..	23·0	..	30·5	22·4	22·2	10·5	8·0	10·7	..
Length of Bore in calibres, including Powder Chamber	**35	..	17	17	18·9	**35	16·9	..	**35	**30	18·9	**35	24·9	21·3	20	17·1	17·4	21·4	..
Number of Grooves, in inches	..	..	36	36	64	..	32	32	..	..	30	..	..	24	24	24	16	24	12
Depth of Grooves "	..	0·070	0·135	0·135	0·135	..	0·110	0·110	..	..	0·090	..	0·060	0·085	0·070	0·055	0·055	0·050	0·050
Twist of Rifling in calibres	..	..	73·5	70	..	..	60	60	..	..	70	..	*24	60	68	*40	50	40	41
Total Weight, in tons	55·7	50·45	39·9	28·2	28·2	19·44	15·0	12·5	13·64	12·74	9·65	6·26	4·08	4·35	4·03	0·60	0·87	0·45	0·35
Weight of: Steel Shell, in lbs.	..	..	665·8	515·9	..	..	249·1	275·6	..	..	172·0	..	90·9	97·6	86·0	..	..	..	..
Weight of: Chilled Shell, "	..	731·9	665·8	515·9	562·2	..	275·6	264·7	..	193·1	169·8	..	119·0	86 0	86·0	..	..	..	..
Weight of: Common Shell, "	626·4	..	639·3	496·0	520·3	268·2	266·8	266·8	192·3	172·4	172·0	73·35	..	81·6	81·6	27·6	24·2	15·2	12·6
Weight of: Case Shot, "	..	..	293·2	216·1	..	..	176·4	176·4	..	..	134·5	..	..	57·3	57·3	27·6	22·3	15·2	11·0
Weight of Firing Charge: Steel Shell, "	..	..	144·4	115·3	..	..	64·2	47·0	..	..	31·5	89·38	..	14·3	18·1	..	..	..	..
Weight of Firing Charge: Chilled Shell, "	..	246·9	144·6	90·6	132·2	..	47·0	47·0	..	72·0	29·3	39·6	37·8	14·3	18·1	..	..	..	..
Weight of Firing Charge: Common Shell, "	..	..	117·3	81·6	132·2	180	42·1	42·1	88·2	72·0	28·4	39·6	..	10·8	14·3	4·5	2·6	3·1	1·3
Muzzle Velocity, in feet	..	1942	1470	1486	1516	2376	1463	1260	1925	1796	1352	2080	‡1739	1206	1463	1225	..	1444	..
Muzzle Energy: Total, foot-tons	..	19140	9974	7903	8960	10500	4095	3035	..	4321	2180	2682	1905	982	1276	..	..	..	..
Muzzle Energy: Per Inch Circumference, foot-tons	..	508·4	264·6	228·8	259·3	371·4	144·7	107·4	..	172·0	86·7	142·3	101·1	51·8	67·74	..	..	..	..
Perforation † at Muzzle, in inches	..	23·6	16·7	15·5	16·5	20·2	12·3	10·5	..	13·5	9·5	12·50	10·5	7·2	8·4	..	..	..	..

** It is doubtful if this refers to the total length of gun or of bore. * Maximum of increasing twist. † Through iron unbacked.
‡ With pyroxiline.

SPANISH NAVAL ORDNANCE.

	Hontoria, Pattern 79.		Hontoria, Pattern 83.								Armstrong, Pattern 83.						Armstrong.			Krupp.				Ordonnez.	
	B.L.		Breech Loading.														Muzzle Loading.		Pattrn 81 B.L.	Breech Loading.				B.L.	
Designation by Calibre .	18-cm	16-cm No. 1.	32-cm.	28-cm.	24-cm.	20-cm.	18-cm.	16-cm.	14-cm.	12 cm.	24-cm.	20·3-cm	15-cm.	12-cm.	8·4-cm	7·5-cm long.	22·86-cm	20·3-cm	6-in.	15-cm.	12-cm.	8·7-cm	7·5-cm	24-cm.	21-cm.
Calibre, in inches . . .	7·09	6·34	12·60	11·02	9·45	7·87	7·09	6·34	5·51	4·72	9·449	8·00	6·00	4·72	3·3	2·95	9·00	8·00	6 00	5·87	4·72	3·43	2·95	9·45	8·27
Length: Total length, in feet	15·57	13·8	38·7	33·8	29·0	..	21·75	19·3	16·91	14·5	29	18·4	17·00	13·75	7·9	7·51	13·0	11·9	14·5	17·13	11·81	6·9	6·3	..	..
Length: Rifled Portion, in inches	141·2	125·6	352·4	309·1	..	..	..	170·6	149·1	126·0	260·2	162·0	158·3	135·8	75·0	70·7	104·0	102·0	126·9	..	..	..	57·6	..	..
Length: Powder Chamber, in inches	..	31·9	86·8	77·1	..	..	..	49·8	53.9	39·4	66·9	43·5	31·4	19	13	13	..	..	29·7	..	..	..	..	35	35
Length: Bore, in calibres.	..	25	50	50	30	..	30	35	35	35	35	26	32	33	27	28·7	14	14·75	26·1	35*	30*	24*	25·8*	..	..
No. of Grooves	42	38	80	70	60	50	45	40	35	30	60	33	28	22	20	18	6	4	28	36	32	24	24	..	..
Depth of Grooves, in inches.	0·06	0·06	0·06	0·06	0·05	0·06	0·04	0·04	0·04	0·04	0·05	0·03	0·037	0·03	0·03	0·03	0·18	0·18	..	0·06	0·06	0·05	0·05	..	..
Twist of Rifling, in calibres.		Increasing from 100 to 49.	From 0 to 30.								30	45	30	40	30	35	45	40	100 to 40	25	25	40	36	24·3	16·3
Total Weight, in tons . .	7·87	5·6	48·2	32·5	20·7	11·5	8·77	6·1	4·1	2·6	21	11·5	5·0	2·2	0·45	0·35	12·5	9·0	4·0	4·6	2·1	0·49	0·30	..	..
Weight: Armour-piercing projectile, in lbs.	135·6	93·7	1041	837·8	438·7	253·5	187·4	130·1	86·0	53·1	445	180	100·0	40·0	..	..	2500	180·0	78·0	85·10	43·65	..	..	429·9	286·6
Weight: Common Shell, in lbs.	120·4	78·3	879·6	586·4	370·4	..	..	112·4	75·0	47·2	393	180	100·0	40·0	15·0	12·0	2500	180·0	83·6	65·70	34·61	14·6	9·48	..	..
Weight: Ring Segment, in lbs.	..	83·8	886·3	590·8	370·4	..	..	112·4	75·0	47·6	..	..	..	40·0	15·0	12·0	..	..	..	..	34·61	14·6	9·04	..	..
Firing Charge: Armour-piercing projectile, in lbs.	..	26·5	485·0	352·7	220·5	127·9	94·8	66·1	44·1	28·7	220	90	55·0	16·0	..	..	50·0	35·0	34·0	37·48	19·29	..	..	154·3	99·21
Firing Charge: Other projectiles	..	24·3	..	..	..	..	..	61·7	..	28·7	145	65	34·0	12·0	4·0	3·75	33·0	21·0	39·0	..	..	10·3	10·4	..	..
Muzzle Velocity, in feet .	..	1631	2034†	2034†	2034†	..	2034	2028	2034	1988	1950	2020	2070	2000	1625	1709	..	..	1936	2001	1887	1539	1552	1772	1706
Muzzle Energy: Total, in foot-tons	..	1729	29850	2403	12580	..	5374	37·10	2466	1511	11730	5094	2972	1109	275	243	..	..	2027	2362	1076	..	..	9363	5782
Muzzle Energy: Per inch circumference, foot-tons	..	87·4	754·3	694·0	423·9	..	241·4	186·3	142·4	101·9	397·4	203·8	156·4	75·15	..	..	..	..	1075	128·1	72·6	..	..	315·4	222·6
Perforation at Muzzle, in inches	..	9·6	28·8	27·6	21·6	..	16·3	14·3	12·5	10·5	20·9	15·0	13·22	9·09	..	..	..	..	10·9	11·9	8·93	..	..	16·9	14·2
Metal and Construction .	St. & Cast I		St. Jacket and Hoops.								St.						St. and Wt. I.		St.	St.				St.	

18 and 16-cm. Palliser guns and 16 and 13-cm. Parrot guns also exist. St. stands for Steel; I. for Iron. There is also a 20-cm. (7·87-in.) B.L. Hontoria, Pattern 79, weighing 10·8 tons, firing an armour-piercing projectile weighing 180·8 lbs. with a charge of 61·73 lbs., and an Ordonnez 30·5-cm. (12·0-in.) gun, firing an 838-lb. projectile with a velocity of 1706 ft.-secs., as well as two lighter pieces. * Total length, the length of bore not being supplied. † These figures are probably estimated, and the power of the guns so great as to be out of the question; compare with British, French or German guns, and the mistake is apparent.

	Sweden.													Norway.										
	Breech Loaders.			Model 76.		Model 81.		Model 83.		M. 85.	M. 86.	M. 89.	M.L.	Krupp, B.L.					Armstrong, M.L.				Palliser, M.L.	
Designation by Calibre, in cms.	27	24	17	27	24	27	12	15	8	25	6·5	15	12	26 No. 2.	26 No. 1.	15	12 No. 2.	12 No. 1.	26·7 No. 3.	26·7 No. 2.	26·7 No. 1.	20·2	16·7	15·5
Calibre, inches	10·80	9·45	6·58	10·80	9·45	10·80	4·72	6·00	3·31	10·00	2·60	6·0	4·80	10·24	10·24	5·91	4·72	4·72	10·51	10·51	10·51	7·94	6·58	6·11
Total Length, feet	17·46	14·96	11·27	17·65	16·24	23·10	10·29	13·87	7 37	28·33	3·79	16·98	8·87	25·59	18·77	12·63	13·78	9·60	16·87	14·65	13·45	10·82	11·58	10·30
Length { Rifled Portion of Bore, ins.	160·8	137·0	107·8	159·2	150·5	191·6	94·5	124·1	71·3	2609	35·0	155·2	83·3	218·9	160·4	112·4	128·6	85·9	138·7	121·0	110·6	85·7	92·4	91·7
Length { Chamber, "	29·9	25·9	16·5	32·3	28·1	66·2	20·6	31·1	9·7	58·1	4·2	35·2	13·6	55·4	34·1	22·6	36·8	16·5	36·8	24·0	20·6	18·5	19·3	10·8
Length { Bore in calibres, "	17·2	17·1	18·7	17·8	18·9	23·9	24·0	25·7	24·3	32·9	15·4	32	20·2	30	19·0	22·8	35	25	16·7	13·8	12·5	13·2	17·0	16·8
Number of Grooves	5	5	5	42	36	45	30	28	24	42	26	28	8	60	60	36	32	32	8	8	8	6	3	3
Twist of Rifling	30*	30*	30*	45*	..	40*	30*	30	33*	40*	22*	30	40	∝25	45	45	∝25	40	55	55	55	50	34	34
Total Weight, tons	23·6	14·4	5·2	23·6	16·4	27·1	1·9	4·2	4·2	29·8	9·4	5·2	1·9	24·8	21·7	3·9	2·31	1·38	21·7	19·7	18·2	7·4	4·9	3·4
Weight of { Armour-piercing Shell in lbs.	476·2†	317·5†	107·1†	476·2†	317·5†	476·2†	..	100·0	..	449·7	..	100	..	606·3	463·0	86·0	57·3	44·1	448·6	393·5	384·9	157·4	109·8	..
Weight of { Common Shell, in lbs.	396·8	224·9	97·7	396·8	273·4	396·8	48·5	100·0	14·8	401·2	6·2	100	34·6	606·3	381·4	69·4	57·3	36·1	316·4	316·4	316·4	153·9	82·7	59·1
Weight of Firing Charge { Armour-piercing Shell, in lbs.	83·8	59·5	22·0	90·4	56·2	206·4	..	35·3	..	242·5	..	54·0	..	191·8	99·2	22·0	19·8	9·9	110·2	82·7	66·1	29·8	22·0	..
Weight of Firing Charge { Common Shell, lbs.	83·8	59·5	22·0	90·4	56·2	145·5	16·0	35·3	3·3	242·5	0·9	..	6·6	191·8	81·6	20·9	19·8	9·9	77·2	77·2	48·5	29·8	16·5	7·72
Muzzle Velocity, feet.	1322	1312	1365	1378	1365	1788	1640	1663	1542	2100	1148	2067	..	1722	1575	1624	1804	1493	1549	1444	1296	1247	1329	1116
Total foot-tons	5771	3789	1384	6272	4102	10550	..	1918	..	13750	..	2964	..	12460	7966	1573	1290	680	7463	5692	4484	1696	1345	..
Muzzle Energy { Per inch Circumference.	170·1	127·6	66·9	184·9	138·2	311·3	..	101·7	..	437·7	..	157·2	..	387·4	247·7	84·7	87·1	45·9	226·0	172·4	135·8	68·0	65·1	..
Muzzle Energy { Perforation through Iron	13·19	11·4	8·3	13·8	11·9	18·4	..	10·4	..	21·9	..	13·1	..	20·4	16·2	9·5	9·7	7·0	15·5	13·4	11·8	8·3	8·2	..

Sweden.—The breech-loaders have breech screw-stoppers. The whole of the guns also discharge case-shot, and the 12-cm. discharge also shrapnel.

Norway.—Besides the chilled shell, there are also chilled solid shot for the 8·5-in. and the 6·5-in. guns, and for all muzzle-loaders case-shot also, and steel shrapnel for some Krupp guns.

* Maximum rate of increasing twist. † Solid shot.

UNITED STATES NAVAL ORDNANCE.

NATURE OF GUN.	Calibre.	Weight.	Total Length.	Total Length of Bore.	Length of Rifling.	Twist of Rifling.	Length of Chamber.	Weight of Service-charge.	Weight of Projectile.	Muzzle Velocity (Service).	Muzzle Energy.	Perforation of Wrought Iron at Muzzle.†
	inch.	tons.	feet.	inch.	inch.		inch.	lbs.	lbs.	ft.-seconds.	ft.-tons.	inch.
4-in. B.L.R., Mark I.	4	1·5	13·7	157·3	130·3	zero to 1 in 25	24·7	12 to 14	33	2000	915	10·1
4-in. R.F.* Gun	4	1·5	13·7	157·5	128·1	..	25·4	..	33	2000	..	10·1
5-in. B.L.R., Mark I.	5	2·8	13·5	150·3	120·8	1 in 180 to 1 in 30	27·1	26 to 29	60	2000	1,660	12·0
5-in. R.F.* Gun	5	3·1	17·4	191·5	164·4	zero to 1 in 25	32·0	28 to 30	50	2300	1,834	13·0
6-in. B.L.R., Mark I.	6	4·8	15·8	176·0	136·7	1 in 180 to 1 in 30	36·9	50	100	2000	2,773	..
6-in. B.L.R., Mark II.	6	4·9	16·1	180·1	144·9	..	32·7	45 to 48	100	2000	..	14·0
6-in. B.L.R., Mark III., of 30 Cals.	6	4·8	16·3	183·8	147·3	zero to 1 in 25	34·0	44 to 47	100	2000	..	..
6-in. B.L.R., Mark III., of 35 Cals.	6	5·2	18·8	213·8	177·3	..	34·0	..	100	2080	2,990	14·8
6-in. B.L.R., Mark III., of 40 Cals.	6	6·0	21·3	243·8	207·3	..	34·0	..	100	2150	3,204	15·6
8-in. B.L.R., Mark I.	8	12·3 / 12·9	21·5	239·9	195·2	1 in 180 to 1 in 30	42·1	105 to 115	250	2000	6,932	19·4
8-in. B.L.R., Mark II.	8	13·0	21·5	239·9	195·2	..	42·1	..	250	2000	..	19·4
8-in. B.L.R., Mark III., of 35 Cals.	8	13·1	25·4	290·5	242·8	zero to 1 in 25	45·1	..	250	2080	7,498	20·6
8-in. B.L.R., Mark III., of 40 Cals.	8	15·2	28·7	330·5	282·8	..	45·1	..	250	2150	8,011	21·6
10-in. B.L.R., Mark I., of 30 Cals.	10	25·7	27·4	306·3	247·3	1 in 180 to 1 in 35	57·2	225 to 240	500	2000	13,864	24·0
10-in. B.L.R., Mark I., of 35 Cals.	10	27·1 / 28·2	30·5	343·8	283·8	zero to 1 in 25	57·2	..	500	2060	14,720	25·8
10-in. B.L.R., Mark II., of 30 Cals.	10	25·1	27·4	307·3	247·3	zero to 1 in 26·8	57·2	..	500	2000	13,864	24·0
10-in. B.L.R., Mark II., of 35 Cals.	10	27·6	31·2	354·9	294·9	zero to 1 in 25	57·2	..	500	2100	15,285	26·6
12-in. B.L.R., Mark I.	12	45·2	36·8	419·2	343·1	..	74·1	425	850	2100	25,985	31·5
13-in. B.L.R., Mark I.	13	60·5	40·0	454·5	370·5	..	80·9	550	1100	2100	33,627	34·6

* R.F., Rapid or Quick-fire. † By Krupp's formula.

NOTE.—The weight of fixed ammunition for R.F. 4-in. and 5-in. guns is 58 and 95 lbs. respectively. A 16-in. gun of 110 tons weight is under consideration.

Diameter of Bore	Inches	1·46	1·46	1·85	2·24	2·24	2·75	3·0	3·5	3·75	4		4		4·7	4·7 *	4·7	4·7	6	6	6		6	8 †		8 †		8	
do. do.	m.m.	Hotchkiss 37	Hotchkiss 37	Hotchkiss 47	Hotchkiss 57	Hotchkiss 57	70	76·2	88·9	95	100		100		120	120	120	120	152	152	152		152	203		203		203	
Length of Bore	Calibres	20	25	40	40	50	30	40	40	40	40		50		40	40	43·9	50	40	40	45		50	40		40		44·6	
do. Gun	do.	22·7	27·8	43·6	43·6	53·6	31·4	41·2	41·3	41·4	41·3		51·3		41·1	41·2	45	51·2	41·54	41·54	46·54		51·54	41·63		41·63		46·3	
Weight of Gun		lbs. 73	lbs. 79	lbs. 506	lbs. 800	cwts. 10	cwts. 7	cwts. 11·8	cwts. 24	cwts. 33	cwts. 32		cwts. 35		cwt 42	wts. 49	cwts. 53	cwts. 55	tons. 5·8	tons 6·6	tons. 8·1		tons. 8	tons. 15·5		tons. 15·5		tons. 19·9	
do. Projectile	lbs.	1·1	1·1	3·3	6	6	10	12·5	20	25	25	30	25	30	45	45	45	45	100	100	100	130	100	210	250	210	250	210	250
do. Charge	..	ozs. 1·25	ozs. 1·25	ozs. 6·8	ozs. 7·75	..	lbs. 0.94	lbs. 1·68	lbs. 3·75	lbs. 4.5	lbs. 5	lbs. 5	lbs. 5	lbs. 5	lbs. 5·5	lbs. 8·4	lbs. 8·4	lbs. 8·4	lbs. 15	lbs. 19·5	lbs. 24	lbs. 24	lbs. 19·5	lbs. 32	lbs. 32	lbs. 44	lbs. 44	lbs. 55	lbs. 55
Muzzle Velocity	f.-s.	1319	1460	2002	1940	2592	1900	2200	2420	2400	2540	2325	2650	2430	2150	2500	2570	2630	2220	2500	2600	2308	2610	2242	2068	2570	2369	§2660	§2500
Velocity at 2,500 Yards	f.-s.	..	..	903	966	1172	983	1084	1256	1348	1251	1351	1386	1412	1275	1481	1518	1564	1517	1706	1777	1721	1784	1626	1582	1850	1850	1915	1900
Muzzle Energy	f.-t.	13·3	18·3	91·7	156·6	279·5	250·3	419·5	812·2	1000	1118	1124	1217	1228	1442	1950	2061	2158	3417	4334	4687	4802	4906	7319	7413	9618	9729	10300	10830
Energy at 2,500 Yards	f.-t.	..	..	18·7	38·8	57·2	67	102	219	302	271	380	333	415	507	684	719	763	1596	2018	2172	2670	2207	3850	4339	4983	5635	5338	6259
Penetration at Muzzle**	inches	1·0	1·5	4·3	4·4	6·0	4·9	6·4	8·7	9·4	9·7	9·7	10·2	10·2	10·0	11·9	12·2	12·5	13·9	15·6	16·3	16·7	16·6	17·6	17·7	20·1	20·2	21·2	21·8
do. do. ‡	..	..	..	5·2	..	8·6	..	8·1	10·9	11·6	11·7	11·8	12·5	12·5	..	14·6	..	15·7	16·4	19·5	20·7	21·1	20·8	20·2	20·2	24·8	24·8	26·1	27·1
Rounds per Minute	..	..	..	30	25	25	25	20	15	15	15	15	15	15	10	10	10	10	7	7	7	5	7	4	3	4	3	4	3

* { 5 Rounds were fired from this gun at a target range 1000 yards in 22 Seconds. 1st round, target struck. 2nd round, upper part of target shot away.

† No cartridge case used.

** As furnished, worked out on some formula at Elswick, giving unusually low results, nearly representing perforation through steel.

‡ Worked out by author on Krupp's formula.

On board the *Royal Arthur* sixteen rounds were fired from a 6-inch quick-firing gun in three minutes at prize firing. The ship was steaming about 8 knots. Range commenced at 1600 yards. Ended at 2200 yards. Target struck fourteen times. In the *Royal Sovereign*, practice almost equally good was obtained; indeed, the worst gun's crew fired nine rounds in the time.

A 6-inch 6·6 ton gun with single motion breech mechanism fired seven rounds in 61 seconds at Silloth, cordite charge, and four rounds in 20 seconds at drill.

An 8-inch 15·5 ton gun with single motion breech mechanism fired three rounds in 28 seconds at drill, and four rounds in 62 seconds on board the cruiser, *Blanco Encalada*, ammunition supplied from magazine.

A 13·5-inch 68 ton gun with hydraulic breech mechanism fired seven rounds in 12 minutes, on H.M.S. *Royal Sovereign*, making six hits on a target, the ship steaming 8 knots, range from 1600 to 2200 yards.

§ Velocities of 2813 and 2670 f.s. are obtained with the 210 and 250 lb. projectiles, respectively, with Battering charges.

CANET QUICK-FIRE GUNS.*

	Quick-Fire Guns of 45, 60, and 80 Calibres.																	
Calibre, in centimètres	5·7	6·5	6·5	7·5	9·0	9·0	10·0	10·0	10·0	12·0	12·0	12·0	14·0	14·0	15·0	15·0	16·0	16·0
Calibre, in inches	2·24	2·57	2·57	3·03	3·90	3·90	3·94	3·94	3·94	4·72	4·72	4·72	5·51	5·51	5·91	5·91	6·30	6·30
Total length, in feet	15·0	12·8	17·1	14·8	17·7	23·6	14·8	19·7	26·3	17·7	23·6	31·5	20·7	27·6	22·2	29·5	23·6	31·5
Total length, in calibres	80	60	80	60	60	80	45	60	80	45	60	80	45	60	45	60	45	60
Weight of Piece, in tons	0·79	0·81	0·94	1·23	2·17	2·51	1·67	2·95	4·18	2·85	5·12	6·00	4·58	8·10	5·61	9·94	6·84	12·10
Weight of Steel Projectile, lbs.	6·61	8·82	8·82	13·23	22·05	22·05	28·66	28·66	28·66	46·30	46·30	46·30	70·55	70·55	88·19	88·19	110·2	110·2
Muzzle Velocity, in foot-secs.	3150	2723	3182	2760	2789	3281	2428	2789	3281	2461	2822	3281	2461	2822	2461	2822	2461	2822
Velocity at 2500 mètres, in foot-secs.	1404	1243	1476	1388	1535	1811	1378	1578	1857	1486	1707	1982	1568	1798	1624	1867	1690	1932
Energy at Muzzle, foot-tons	454·9	453·3	619·3	695·0	1421	1841	1172	1536	2140	1944	2555	3456	2952	3895	3703	4869	4632	6086
Energy at 2500 mètres, foot-tons	90·4	94·6	133·4	176·6	360·4	501·4	375·9	495·7	685·5	709·1	934·5	1261	1203	1582	1613	2131	2183	2843
Perforation through wrought iron at Muzzle — By French formula, ins.	11·4	10·0	12·4	11·4	13·7	18·2	12·2	15·1	19·7	14·8	18·4	23·2	17·2	21·2	18·5	23·2	22·2	25·2
Perforation through wrought iron at Muzzle — By English formula, ins.	8·4	7·9	9·1	9·0	10·3	12·2	10·2	11·7	13·8	12·0	13·8	16·0	13·7	15·7	13·4	17·0	16·0	18·4
Perforation at 2500 mètres — By French formula, ins.	3·3	3·0	3.7	4·0	5·6	7·3	5·1	6·3	8·2	7·0	8·5	10·7	8·6	10·6	9·8	12 3	11·4	14·5
Perforation at 2500 mètres — By English formula, ins.	..	..	..	..	..	..	5·6	..	..	..	..	..	..	..	9·6	..	10·9	..

NOTE.—The Canet 15-cm. and 12-cm. guns fire respectively 12 and 10 rounds per minute.

* The figures in this Table have been obtained from Canet, except that they are here converted into English measures.

KRUPP QUICK-FIRE GUNS.

Quick-Fire Guns of 40 and 50 calibres in length.

Calibre, in centimetres	4		4·7		5		5·3		5·7		6		7		7·5		8	
Calibre, in inches	1·57		1·85		1·97		2·09		2·24		2·36		2·76		2·95		3·15	
Total Length, in feet	5·25	6·56	6·17	7·71	6·56	8·20	6·95	8·69	7·48	10·35	7·87	9·84	9·19	11·48	9·84	12·30	10·50	13·12
Length of Bore, in inches	56·9	72·6	67·5	86·0	72·0	91·7	76·4	97·2	82·1	104·5	86·6	110·2	100·8	128·4	108·3	137·8	115·8	147·2
Length of Gun, in calibres	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50
Weight of Piece, in lbs.	216·1	238·1	352·7	388·0	423·3	467·4	504·9	555·6	628·3	622·2	731·9	806·9	1164·0	1280·9	1430·8	1576·3	1719·6	1913·6
Weight of Piece, in tons	..	..	..	..	..	..	..	..	0·28	0·31	0·33	0·36	0·52	0·57	0·64	0·70	0·77	0·85
Weight of Steel Projectile, in lbs.	1·94		3·53		3·97		4·50		5·60		6·53		10·36		12·74		15·45	
Weight of Charge, in lbs.	0·35		0·57		0·68		0·81		1·01		1·18		1·87		2·30		2·79	
Muzzle Velocity, in ft.-secs.	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493	2379	2493
Muzzle Energy, in foot-tons	76	83	123	135	148	162	177	194	219	241	256	281	406	447	500	549	606	666
Perforation through Steel,* in inches	3·31	3·54	3·90	4·17	4·17	4·45	4·49	4·76	4·80	5·12	5·08	5·43	5·98	6·42	6·46	6·89	7·05	7·40

Calibre, in centimetres	8·4		8·7		9		10·5		12		13		14		15		16	
Calibre, in inches	3·31		3·43		3·54		4·13		4·72		5·12		5·51		5·87		6·30	
Total Length, in feet	11·02	13·78	11·42	14·27	11·81	14·76	13·78	17·22	15·75	19·69	17·06	21·33	18·37	22·97	19·55	24·61	21·00	26·25
Length of Bore, in inches	121·9	154·9	126·4	130·6	131·1	166·5	153·6	194·9	176·4	223·7	190·2	241·4	205·4	260·5	218·4	279·0	234·5	297·5
Length of Gun, in calibres	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50	40	50
Weight of Piece, in lbs.	2010·6	2215·6	2233·3	2460·3	2473·6	2724·9	..	..	..	..	..	..	..	..	..	..	..	..
Weight of Piece, in tons	0·90	0·99	1·00	1·10	1·10	1·22	1·64	1·87	2·35	2·68	3·12	3·54	3·88	4·41	4·70	5·35	5·88	6·69
Weight of Steel Projectile, in lbs.	17·90		19·89		22·05		30·9		44·1		58·4		72·8		88·2		110·2	
Weight of Charge, in lbs.	3·23		3·59		3·98		6·83		9·70		12·34		15·43		18·52		23·15	
Muzzle Velocity, in ft.-secs.	2379	2493	2379	2493	2379	2493	2461	2625	2461	2625	2461	2625	2461	2625	2461	2625	2461	2625
Muzzle Energy, in foot-tons	702	771	780	857	865	950	1296	1475	1851	2107	2453	2791	3055	3476	3703	4213	4628	5266
Perforation through Steel,* in inches	7·28	7·80	7·64	8·11	7·87	8·43	8·90	9·76	9·96	10·91	11·14	12·24	12·05	13·19	12·95	14·17	14·06	15·39

* Of medium hardness.

N.B.—This Table has been kindly supplied, on request, by Krupp.

TABLE OF MODERN RIFLES IN USE OR ABOUT TO BE ADOPTED BY THE NAVAL POWERS. PREPARED BY W. LAIRD CLOWES.

Country.	Model.	Calibre.	Length.		Weight.		Rifling.		Magazine.		Sighting.	Cartridge.		Bullet.		Charge.		Initial Velocity. Foot-Seconds.
			Rifle.	Bayonet Blade.	Rifle, Empty.	Bayonet.	No. of Grooves.	Length of twist.	Nature and Position.	Weight of Clip or Box.		Length.	Weight.	Length.	Weight.	Powder.	Weight.	
		in.	in.	in.	lbs.	oz.		in.		grs.	yds.	in.	grs.	in.	grs.		grs.	
Great Britain	Martini-Henry, m. iv.	·450	49·5	18·12	9·12	24·0	7	22·0	Single loader	..	1450	..	766·5	..	480·0	Black	85·0	1253
,,	Lee-Metford, m. ii.	·303	49·5	12·0	9·25	15·0	7	10·0	Box of 10 under receiver	2030	2900	2·99	436·7	1·25	215·0	Cordite	30·0	2200
Argentine	Mauser, m. 91	·301	48·63	16·14	8·6	20·0	4	9·86	Box of 5 under receiver	92·5	2187	3·07	416·7	1·2	211·6	Smokeless	40·9	2120
Austria-Hungary	Mannlicher, m. 88–90	·315	50·43	9·84	9·9	14·82	4	9·84	Box of 5 under receiver	262	2460	2·992	437·5	1·98	243·8	M. 1892	42·44	..
,, ,, (Carbine)	Mannlicher, m. 90	·315	41·54	..	7·25	..	4	9·84	Box of 5 under receiver	262	1968	2·992	437·5	1·98	243·8	M. 1892	42·44	1903
Brazil	Mannlicher, m. 93	·296	..	..	..	..	4	..	..	..	..	..	..	..	..	Smokeless	..	..
Chili	Mannlicher, m. 88	·315	50·4	9·75	9·7	13·0	4	9·84	Box of 5 under receiver	339	2406	2·99	454·0	1·25	235·0	Smokeless	40·0	2060
,,	Mauser, m. 93	·276	50·16	9·84	8·6	..	4	9·8	Box of 5 under receiver	147	..	..	398·0	1·19	173·0	Smokeless c. 87	39·4	2284
Denmark	Krag-Jörgensen, m. 89	·315	52·37	9·0	9·5	8·5	6	11·81	Box of 5 under receiver	339	2078	2·988	463·0	1·18	235·0	Smokeless	34·0	1950
France	Lebel, m. 86	·315	51·46	22.58	9·22	14·11	4	9·45	Tube of 8 under barrel	..	3520	2·95	447·5	1·14	231·0	Vielle Flake	43·2	2190
,, (Carbine)	Berthier, m. 90	·315	37·21	..	6·61	..	4	9·45	Box of 3 under receiver	146	2187	2·95	447·5	1·14	231·0	Vielle Flake	43·2	2190
Germany	Ex. m. 88 (Mauser-Mannlicher)	·311	48·8	10·0	8·4	13·0	4	9·45	Box of 5 under receiver	269	4400	3·24	425·0	1·24	226·8	Spandau Flake	42·4	2035
Greece	Gras, m. 74	·433	51·18	20·87	9·26	..	4	21·65	Single loader	..	1968	2·99	521·6	..	386·0	Black	81·02	1411
Italy	Vetterli-Vitali, m. 70–87.	·408	52·96	19·88	9·86	21·13	4	25·98	Box of 4 under receiver	308	1968	2·63	447·5	1·01	246·9	Ballistite	37·0	2018
,,	Parravicino-Carcano, m. 92	·256	50·78	11·8	8·42	11·99	4	7·86	Box of 6 under receiver	..	2077	3·27	339·5	1·2	155·1	Ballistite	32·31	2320
Japan	Murata, m. 87	·315	48·03	11·0	9·0	10·5	4	11·0	Tube of 8 under barrel	..	4400	2·905	468·0	1·18	238·0	Wetteren Smokeless	36·0	1850
Netherlands	Beaumont-Vitali, m. 71–88	·433	51·97	20·15	9·96	13·05	4	29·9	Box of 4 under receiver	308	1968	2·49	679·0	1·06	385·8	Black	77·16	1329
,, ,,	Mannlicher, m. 93	·256	50·39	10·35	9·04	15·5	4	7·87	Box of 8 under receiver	155	2297	3·03	346·6	1·36	155·1	Troisdorf	36·0	2300
Norway	Krag-Jörgensen, m. 93	·256	..	..	8·8	8·46	4	..	Box of 5 under receiver	..	2406	..	362·7	..	..	..	..	..
Portugal	Kropatschek, m. 86	·315	51·75	18·79	10·22	19·2	4	11·0	Tube of 8 under barrel	..	2406	3·222	539·0	1·26	245·0	Mendonça-Corteso	35·4	1984
Russia	Mouzin, m. 91	·300	50·79	16·88	8·8	10·88	4	9·44	Box of 5 under receiver	140	3520	3·05	426·7	1·2	211·2	Smokeless	35·6	2034
Spain	Remington, m. 71	·433	..	..	..	..	6	25·5	Single loader	..	1100	..	623·0	1·14	385·8	Black	63·0	1410
,,	Mauser, m. 92–93	·276	50·16	9·84	8·6	..	4	9·8	Box of 5 under receiver	147	..	3·07	398·0	1·19	245·0	Smokeless	37·7	2285
Sweden	Remington, m. 67–89–92	·315	49·01	19·10	8·81	17·88	6	11·33	Single loader	..	1094	2·99	541·0	..	223·0	Apyrite	53·0	2004
Turkey	Mauser, m. 87	·374	49·41	18·5	9·41	25·04	4	19·68	Tube of 9 under barrel	..	1750	2.97	555·6	1·05	284·0	Black	69·4	1758
,,	Mauser, m. 90	·301	48·6	18·5	8·6	21·9	4	9·84	Box of 5 under receiver	92·5	2187	3·07	416·7	1·2	212·9	Smokeless c. 91	40·9	2067
United States	Springfield, m. 84	·450	51·91	18·0	9·3	12·0	3	22·0	Single loader	..	3500	2·82	744·0	1·31	500·0	Du Pont Black	70·0	1315
,, ,,	Modifd. Krag-Jörgensen, m. 92	·300	49·10	11·75	9·44	15·5	4	10·0	Box of 5 under receiver	656	2200	3·098	415·7	1·265	220·0	Leonard	44·0	2000
,, ,,	Naval, m. 93	·236	..	..	..	..	6	6·5	..	..	..	..	..	..	135·0	Smokeless	33·0	2400

Table Relating to Conversion of Measures.

Length.

Metric to English.				English to Metric.					
I. Mètres.	II. Yards.	III. Feet.	IV. Inches.	V. Yards.	VI. Mètres.	VII. Feet.	VIII. Mètres.	IX. Inches.	X. Centimètres.
1	1·0936	3·2809	39·37	1	0·91438	1	0·30479	1	2·5400
2	2·1873	6·5618	78·74	2	1·82877	2	0·60959	2	5·0799
3	3·2809	9·8427	118·11	3	2·74315	3	0·91438	3	7·6199
4	4·3745	13·1236	157·48	4	3·65753	4	1·21918	4	10·1598
5	5·4682	16·4045	196·85	5	4·57192	5	1·52397	5	12·6998
6	6·5618	19·6854	236·22	6	5·48630	6	1·82877	6	15·2397
7	7·6554	22·9663	275·60	7	6·40068	7	2·13356	7	17·7797
8	8·7491	26·2472	314·97	8	7·31507	8	2·43836	8	20·3196
9	9·8427	29·5281	354·34	9	8·22945	9	2·74315	9	22·8596

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of yards in 2354 mètres (see cols. I. & II.). mètres. yards. 2000=2187·3 300= 328·09 50= 54·68 4= 4·37 ∴ 2354=2574·44	of feet in 12·4 mètres (see cols. I. & III.). mètres. feet. 10 =32·809 2 = 6·562 0·4= 1·312 ∴ 12·4=40·683	of inches in 30·5 centimètres (see cols. I. & IV.). Note, 1 m.=100 cm. cms. inches. 30·0=11·811 ·5= ·197 ∴ 30·5=12·008	of mètres in 1026 yards (see cols. V. & VI.). yards. mètres. 1000=914·38 20= 18·29 6= 5·49 ∴ 1026=938·16	of mètres in 1742 feet (see cols. VII. & VIII.). feet. mètres. 1000=304·79 700=213·36 40= 12·19 2= 0·61 ∴ 1742=530·95	of centimètres in 17·72 ins. (see cols. IX. & X.) inches. cms. 10·0 =25·400 7·0 =17·780 0·7 = 1·778 ·02= ·051 ∴ 17·72=45·009

Note.—A ready way of approximately converting all French measures into English inches is to multiply by 4 and apply the decimal point by common sense—Thus for a 15-cm. gun; 15 × 4 = 60. Now this Calibre cannot be 60 inches, nor can it be 0·6 inch; therefore it must be 6 inches. (The exact value is 5·906 in.)

Weight.

Metric to English.				English to Metric.					
I. Kilogrammes.	II. Tons.	III. Pounds Avoirdupois.	IV. Grains Troy.	V. Tons.	VI. Milliers.	VII. Pounds Avoirdupois.	VIII. Kilogrammes.	IX. Grains. Troy.	X. Gramme.
1	·000984	2·2046	15432·3	1	1·016	1	0·4536	1	·0648
2	·001968	4·4092	30864·7	2	2·032	2	0·9072	2	·1296
3	·002953	6·6139	46297·0	3	3·048	3	1·3608	3	·1944
4	·003937	8·8185	61729·4	4	4·064	4	1·8144	4	·2592
5	·004921	11·0231	77161·7	5	5·080	5	2·2680	5	·3240
6	·005905	13·2277	92594·1	6	6·096	6	2·7216	6	·3888
7	·006889	15·4323	108026·4	7	7·112	7	3·1751	7	·4536
8	·007874	17·6370	123458·8	8	8·128	8	3·6287	8	·5184
9	·008858	19·8416	138891·1	9	9·144	9	4·0823	9	·5832

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of tons in 35 milliers (see cols. I. & II. Note, 1000 kg. =1 millier). milliers. tons. 30 = 29·53 5 = 4·92 ∴ 35 = 34·45	of pounds in 56·3 kilo- grammes. (see cols. I. & III.). kgrms. lbs. 50 =110·231 6 = 13·228 0·3= ·661 ∴ 56·3=124·120	of grains in 120 grammes (see cols. I. & IV. Note, 1000 grms. = 1 kg.) grammes. grains. 100=1543·23 20= 308·65 ∴ 120=1851·88	of milliers in 38 tons (see cols. V. & VI.). tons. milliers. 30 = 30·48 8 = 8·13 ∴ 38 = 38·61	of kilogrammes in 68 pounds (see cols. VII. & VIII). lbs. kgs. 60 = 27·216 8 = 3·629 ∴ 68 = 30·845	of grammes in 85 grains (see cols. IX. & X.). grains. grammes. 80 = 5·184 5 = 0·324 ∴ 85 = 5·508

Note.—7000 grains troy=1 pound avoirdupois.

PRESSURE.

Metric to English.			English to Metric.				Atmospheric to English.		English to Atmospheric.	
I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
Kilo-grammes per square centi-mètre.	Pounds per square inch.	Tons per square inch.	Pounds per square inch.	Kilo-grammes per square centi-mètre.	Tons per square inch.	Kilo-grammes per square centi-mètre.	Atmo-spheres.	Tons per square inch.	Tons per square inch.	Atmo-spheres.
1	14·223	·00635	1	·07031	1	157·49	1	·00656	1	152.38
2	28·446	·01270	2	·14062	2	314·99	2	·01313	2	304·76
3	42·668	·01905	3	·21093	3	472·48	3	·01969	3	457·14
4	56·891	·02540	4	·28124	4	629·97	4	·02625	4	609·52
5	71·114	·03175	5	·35155	5	787·47	5	·03281	5	761·91
6	85·337	·03810	6	·42186	6	944·96	6	·03938	6	914·29
7	99·560	·04445	7	·49217	7	1102·45	7	·04594	7	1066·67
8	113·783	·05080	8	·56248	8	1259·95	8	·05250	8	1219·05
9	128·005	·05715	9	·63279	9	1417·44	9	·05906	9	1371.43

Note.—One atmosphere is taken to be 14·7 lbs. per square inch.

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of pounds per square inch in 32·1 kilogrammes per square centimètre (see cols. I. & II.).	of tons per square inch in 3210 kilogrammes per square centimètre (see cols. I. & III.).	of kilogrammes per square centimètre in 15 lbs. per square inch (see cols. IV. & V.).	of kilogrammes per square centimètre in 18·3 tons per square inch (see cols. VI. & VII.).	of tons per square inch in 3254 atmospheres. (see cols. VIII. & IX.).	of atmospheres in 14·6 tons per square inch (see cols. X. & XI.).
kgs. per sq. cm. = lbs. per sq. in.	kgs. per sq. cm. = tons per sq. in.	lbs. per sq. in. = kgs. per sq. cm.	tons per sq. in. = kgs. per sq. cm.	atmospheres. = tons per sq. inch.	tons per sq. in. = atmospheres.
30 = 426·68	3000 = 19·05	10 = ·7031	10 = 1574·9	3000 = 19·69	10 = 1523·8
2 = 28·45	200 = 1·27	5 = ·3516	8 = 1259·95	200 = 1·31	4 = 609·5
0·1 = 1·42	10 = ·06		0·3 = 47·25	50 = ·33	0·6 = 91·4
				4 = ·03	
32·1 = 456·55	∴ 3210 = 20·38	∴ 15 = 1·0547	∴ 18·3 = 2882·10	∴ 3254 = 21·36	∴ 14·6 = 2224·7

ENERGY.

Metric to English.		English to Metric.	
I.	II.	III.	IV.
Mètre-tons.	Foot-tons.	Foot-tons.	Mètre-tons.
1	3·2291	1	0·3097
2	6·4581	2	0·6194
3	9·6872	3	0·9291
4	12·9162	4	1·2388
5	16·1453	5	1·5484
6	19·3743	6	1·8581
7	22·6034	7	2·1678
8	25·8324	8	2·4775
9	29·0615	9	2·7872

1 mètre-ton is termed a "dinamode" in Italy.

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus find the number

of foot-tons in 4367 mètre-tons (see cols. I. & II.).	of mètre-tons in 3592 foot-tons (see cols. III. & IV.).
mètre-tons. = foot-tons.	foot-tons. = mètre-tons.
4000 = 12916·2	3000 = 929·1
300 = 968·72	500 = 154·84
60 = 193·74	90 = 27·87
7 = 22·60	2 = ·62
∴ 4367 = 14101·26	∴ 3592 = 1112·43

PERFORATION THROUGH IRON AND STEEL WITH THE FACE NOT HARDENED.

To obtain perforation through steel equivalent to a given perforation through iron, and *vice versâ*.

1 inch steel = $1\frac{1}{4}$ inches iron ;

that is, 4 inches steel = 5 inches iron.

Thus, given 9·4 inches perforation through iron,

$$9{\cdot}4 \times \frac{4}{5} = 7{\cdot}52 \text{ inches steel};$$

or, given 5·2 inches steel,

$$5{\cdot}2 \times \frac{5}{4} = 6{\cdot}5 \text{ inches iron.}$$

PART IV.

STATISTICS, OFFICIAL STATEMENTS AND PAPERS.

Statement of the First Lord of the Admiralty explanatory of the Navy Estimates for 1895–96.

THE Navy Estimates for 1895-96 amount to a net total of £18,701,000, or £1,334,900 more than the sum voted for 1894-95, and £4,460,900 more than the sum voted for 1893-94.

In my statement of last year I explained the reasons for the large increase of the Estimates for 1894-95. The continued increase this year is due to the same causes. In regard to new construction and armaments, the steady progress of the ships laid down in 1894-95, and the proposed commencement of the new ships forming part of the Five Years' Programme undertaken last year, and which has in no respect been enlarged, require increased expenditure. When it is considered that in addition to these requirements it is necessary to find more men to man the larger and more numerous ships of the fleet, to make larger docks for their accommodation, and safer harbours for their protection, and also to improve and develop our Naval Reserves, it is not surprising that the demands on the Estimates are serious and large.

During the early part of this year it was found desirable for the proper and economical administration of the dockyards to provide, at a much earlier date than was originally anticipated, certain stores required for the ships under construction. Orders have been given for the manufacture in this financial year of additional supplies of armour, steel plates, angles and other shipbuilding stores.

The increased number and larger size of ships in commission on the China and Mediterranean Stations and elsewhere have further occasioned the shipment to depôts abroad of large quantities of coal and reserve warlike stores. It was desirable to replenish without loss of time the depôts at home from which these stores had been shipped.

The Admiralty have also been alive to the importance of taking immediate steps to convert the ordinary 6-inch and smaller B.L. guns into quick-firing guns.

The favourable state of the market rendered the early placing of these orders advantageous from an economical point of view, and the

Treasury having concurred in the presentation of a Supplementary Estimate to cover expenditure for these services in excess of the provision made in the Estimates of last year, details will shortly be laid on the table of the House of Commons.

Numbers.

The number of Officers, Seamen, Boys, Coastguard, and Royal Marines voted for 1894–95 was 83,400. It is satisfactory to find that this total number has been almost attained at the present time, the actual number borne on the 1st February being 82,923. During the course of the year 6223 men have been added, comprising among others—1589 seamen class, 162 artisans, 281 engine-room artificers, 2519 stokers, 1169 boys, and 453 marines.

Early in the year it appeared likely that the proposal to recruit 800 men from the mercantile marine and other sources would not be successful, and steps were taken to commission a cruising training-ship (Northampton) for the purpose of receiving boys on board at an age later than that required for entry into the permanent boys' training ships. These boys will pass into the service after six months or more of training. In the course of this service the Northampton cruised to different parts of the coasts of Great Britain and Ireland.

This experiment succeeded in obtaining a sufficient number of boys to complete the complement allotted to the ship, and as far as can be judged was most satisfactory; it cannot, however, be deemed complete until after the boys, who have now commenced joining the fleet, have been tried afloat. It is proposed to continue the work of the Northampton this year, and not to revert to the proposal of recruiting men from the mercantile marine.

The question of the number of officers available for service both in peace and in war, and the flow of promotion in the executive lists of the Navy, has called for the serious attention of the Board. The present system of promotion and retirement was established by Order in Council in 1870, but from time to time modifications have been made, and it had become indispensable to make a searching enquiry into the operation of the scheme, having regard to the present requirements of the Navy. For this purpose a committee was appointed under the presidency of Admiral Sir A. Hoskins, and their report is now under the consideration of the Board and of the Treasury.

The number of cadets in the Britannia has been raised from 240 to 270 during the year. This number will be further supplemented by an increase in the numbers of nominations given to the Conway and Worcester. It is anticipated that the necessarily slow and gradual

increase in the number of young officers trained in the Britannia will, in the course of time, place the active list of the Navy on a satisfactory footing; but as this end cannot be reached for several years, the attention of the Admiralty is seriously engaged in the consideration of the best means of supplying the immediate requirements of the service.

The numbers proposed for this year in Vote A are 88,850, an increase of 5450 over last year.

The chief gunners, boatswains and carpenters will be increased by 14, and warrant officers by 100.

Forty assistant engineers for temporary service will be entered to supplement the entries on the permanent list.

It is proposed to add 174 chief and engine-room artificers to the present numbers, raising the total for the year to 2134, and also to increase the number of stokers by 1750, bringing the total number of this rating to 15,232.

There will be a net increase among the seamen-class men of 1500, including about 500 expected to be obtained from the Northampton. The boys (service and under training) will be increased by 1100.

NEW CONSTRUCTION.

Shipbuilding under the Naval Defence Act in 1894–95.

The five second-class cruisers and four torpedo gunboats which I referred to as still incomplete at the close of the last financial year will have been all completed by the end of the present financial year, thus terminating the programme of the Naval Defence Act of 1889. The limit of five years originally fixed for the completion of the ships has been exceeded in regard to these vessels, the authority of an Act of Parliament having been obtained for the purpose.

Other Shipbuilding in 1894–95.

The programme of new construction, of which I gave a sketch in my statement of last year, has been carried out in most of its main features, although under circumstances of considerable difficulty, owing to labour disputes in the private trade, and to very severe weather at the commencement of 1895.

Battleships.

The construction of the Majestic and Magnificent has been advanced more rapidly than that of any preceding battleships. Each of these vessels was floated out of dock within twelve months of the

date of laying the keel. At the time they left the dock nearly the whole of the hull-armour was in place, and the work of fitting had been taken in hand.

These results have been achieved by great exertion, skill, and perseverance on the part of the superintendents, officers and men of Portsmouth and Chatham Dockyards, and without interference with the ordinary working of the dockyards.

The Renown, building at Pembroke, will be launched early in 1895–96. Before she is launched, this vessel will be practically complete as regards the hull-structure and armour protection, while the work of internal fitting will also be in a forward state.

Of the seven first-class battleships included in the new programme commenced in 1894–95, five are building in the dockyards, and two by contract.

The vessels on which most progress has been made are the Prince George at Portsmouth, and the Victorious at Chatham, both of which it is anticipated will be launched during next summer.

The Illustrious at Chatham and the Cæsar at Portsmouth were only intended to be in a very early stage of construction at the close of the financial year 1894–95. A considerable amount of preparatory work has been done for them, and good progress is contemplated in the coming financial year.

The Hannibal, building at Pembroke, has been advanced to the extent contemplated in the estimates.

The Mars, building by Messrs. Laird at Birkenhead, has also been pushed forward very rapidly by the contractors. The Jupiter, building by Messrs. Thomson on the Clyde, has been advanced as fast as circumstances permitted; but progress has been greatly hindered by the Scotch coal strike, which also affected all contracts for new ships and machinery placed in the Clyde district. Since the strike ended, the progress of work on the Jupiter has been continuous.

Cruisers.

The first-class cruisers, Powerful and Terrible, building by contract at Barrow and on the Clyde, have been very rapidly advanced during 1894–95, and it is anticipated that they will be launched during next summer.

The building of the three second-class cruisers of the Talbot class in the dockyards has progressed satisfactorily during the year, and it is proposed to complete them early in the financial year 1896–97.

Six other vessels of the class, included in the new programme, are building by contract, four of them on the Clyde and two at Barrow. Progress on the former has been retarded by the recent coal strike, but it is now anticipated that no further delays will occur.

Four sloops are in course of construction in the dockyards, and it is proposed to complete them in the autumn of this year.

Torpedo-boat Destroyers.

In my statement of last year it was explained that 42 vessels of this class had been ordered by contract, and that it had been made a condition in these contracts that the vessels should be completed in the financial year 1894-95.

The leading firms of shipbuilders and engineers who undertook the construction of these vessels have, owing to various circumstances, been unable to fulfil this condition. Some have been prejudicially affected by labour difficulties; and in all cases the novelty of the designs, and the very high speed demanded, have involved the expenditure of considerably greater time in construction and trials than had been anticipated. In the case of the vessels which have completed their trials, the contract speeds have been obtained, and in some cases materially exceeded. Exhaustive experimental trials made at sea with some of the vessels first delivered have shown that the intentions of the designs will be realised in the class, and that they will be admirably adapted to the special service for which they are required.

It is now anticipated that at the close of the year 1894–95, one-third of the total number of vessels will have completed their trials, and either have been delivered or be practically ready for service, but the severe weather in January and February makes an exact statement impossible.

In the course of the first two months of the new financial year a considerable proportion of the remaining vessels of the class will be completed, and the others will be approaching completion.

About £1,200,000 was provided for these vessels in the Estimates for 1894–95; and it is now anticipated that nearly £940,000 will be earned: a result which indicates sufficiently the advanced condition of the vessels still unfinished.

NEW PROGRAMME.

(SECOND YEAR, 1895–96.)

In the coming financial year it is proposed to commence four first-class cruisers, four second-class cruisers, two third-class cruisers, and twenty torpedo-boat destroyers.

First-class Cruisers.

Three of the first-class cruisers and all the torpedo-boat destroyers are to be built by contract. The remainder of the vessels will be laid down in the dockyards.

The complete designs for the first-class cruisers, which will be improved Blenheims, are not yet finally settled, and the details cannot, therefore, be furnished at present.

Second-class Cruisers.

The second-class cruisers will have the following principal dimensions: Length, 320 ft.; breadth, 57 ft.; displacement about 5,750 tons.

The armament will be very nearly the same as that of the Talbot class.

The protective arrangements are also similar, although in some features the protection will be increased in the new vessels.

It is proposed that they shall be fitted with water-tube boilers giving 10,000 horse power with natural draught, the corresponding speed being 18½ to 19 knots.

Third-class Cruisers.

The third-class cruisers may be described as improved Barhams with water-tube boilers. Their principal dimensions will be:—Length, 300 ft.; breadth, 36 ft. 6 in.; displacement, about 2100 tons.

They will resemble the Barhams in the arrangements of their protective deck, but will have greater freeboard and much larger coal capacity.

Their armament will consist of eight 4-in. quick-firing guns, eight 3-pounders, and smaller guns. They will also have a torpedo armament similar to that of the Barham.

The vessels of the Barham class are fitted with groups of locomotive boilers, which have not proved so satisfactory as was anticipated. The new vessels will be fitted with water-tube boilers of approved

types, such as have been already used successfully in torpedo gun-boats, and in torpedo-boat destroyers.

The maximum horse-power will be 7000, the corresponding speed being about 20 knots.

Torpedo-boat Destroyers.

In the case of the torpedo-boat destroyers, to be laid down during the year, a still higher speed will be demanded than has been obtained in any of the vessels yet built. The matter is still under consideration; up to the present time no design has been finally approved.

Summary of New Construction.

From the preceding statement it will be seen that in the financial year 1895–96 the following vessels will be under construction:—

In the dockyards—
- Eight first-class battleships.
- One first-class cruiser.
- Seven second-class cruisers.
- Two third-class cruisers.
- Four sloops.

In private yards—
- Two first-class battleships.
- Five first-class cruisers.
- Six second-class cruisers.
- Forty-five to fifty torpedo-boat destroyers (the number being dependent upon the completion of trials).

Reconstruction and Repairs.

By the end of the present financial year the following ships will have been repaired and re-fitted:—Northumberland, Rodney, Imperieuse, Dreadnought, Immortalité, Narcissus, Blanche and Sharpshooter.

It was contemplated that the Monarch would also be completed in the present financial year, but her final completion has been allowed to stand over till a somewhat later date. The Monarch, Sultan, Phaeton, Comus, and Cordelia will be completed during 1895.

Dockyard Administration.

The working hours in the dockyards have been reduced during the past year to an average of forty-eight a week, with the loss of certain privileges, but without a reduction of wages. The new system has not been yet sufficiently tried to enable an opinion to be given

whether the output of work has been lessened or not. The first experience of the change has been decidedly favourable, and it is hoped that the reduction in the hours will to a great extent be compensated by the increased efficiency of the labour.

Boilers and Machinery.

During the year 1894–5 the last of the ships ordered under the Naval Defence Act, viz., five second-class cruisers and four torpedo-gunboats, have successfully passed through the official steam trials.

The battleship Monarch (which has been supplied with new engines and boilers), six torpedo-boat destroyers and several smaller vessels, had also satisfactorily completed their trials by January, 1895.

The fitting of new boilers of the Belleville type in the torpedo-gunboat Sharpshooter, in lieu of her original boilers of locomotive type, has been completed, and they have been tested on board during prolonged trials, with good results. The ship has been attached to the Channel Squadron to obtain further experience of the working of this type of boiler under sea-going conditions.

The Speedy, a sister vessel, fitted with Thornycroft boilers capable of being forced under air pressure, has also been employed for a similar purpose. So far, the performances of the boilers of these two ships have been entirely satisfactory, and justify their further use in other ships.

The Spanker, a vessel of the same class, is also being fitted with water-tube boilers of the Du Temple type, and it is expected that she will be completed before the end of this financial year. It is proposed to substitute for the locomotive boilers of two other vessels of this class a suitable type of water-tube boilers.

The six torpedo-boat destroyers referred to above are fitted with water-tube boilers. These have proved to be quite satisfactory in their working under extreme tests, and the performance of the machinery in all cases exceeded that which the makers guaranteed.

The Admiralty have desired to encourage the production of water-tube boilers of home design, but the novelty of this class of work to most engineers of this country has somewhat delayed the completion of many of the torpedo-boat destroyers during the year. The delay, however, has been attended with the advantage of obtaining much experience. It is proposed to adopt boilers of the water-tube type in the new ships to be laid down in 1895–96.

Armour Plate Experiments and Manufacture.

During the year various experimental armour plates have been submitted by manufacturers for the purposes of test.

None of these, however, have shown qualities equal to those possessed by the Harveyed steel armour, mentioned in my statement of last year. Consequently, armour of that description has been maintained in use, and the demands made upon the manufacturers during the past year have been very considerable.

The manufacturing firms have shown, as on previous occasions, their readiness to do their utmost to meet the requirements of the Admiralty. It is anticipated that there will be no difficulty in carrying out the orders placed under the New Programme, the area of supply for armour having been somewhat enlarged.

Naval Ordnance.

The progress of gun manufacture during the year has been satisfactory.

The 12-inch wire guns have been tried with excellent results. Twenty-six of these guns are now either completed or in progress, and it is proposed to commence nineteen more in 1895–96. That number will complete the outfits and reserves of the nine battleships of the Majestic class.

The guns of the Renown, Powerful and Terrible are in progress, and will be ready in good time.

The great importance of the quick-firing type of guns has been fully recognised, and the whole of the 6-inch and smaller guns now under construction are on that system.

With the exception of one second-class cruiser on a foreign station, all the ships built under the Naval Defence Act are now armed with these guns.

In October, 1893, experiments were commenced with the view of converting the 6-inch, 5-inch and 4-inch breech-loading guns into quick-firers. These experiments having been carried to a successful issue, the conversion of a large number of guns has been undertaken. These guns will take the place of the ordinary B.L. guns in the battleships and cruisers not already armed with quick-firers.

Notwithstanding the explosion at Waltham Abbey, the production of cordite for the Navy during 1894–95 will approach 450 tons. Steps have been taken to place orders with the private trade, and thus increase the area of supply.

Cordite has been adopted for the new 12-inch and 9·2-inch guns, as well as for the quick-firing guns, and the reports of its behaviour are very satisfactory.

The Lee-Metford magazine rifle has been supplied to the Royal Marine divisions, and its issue to the service afloat will be proceeded with during 1895-96.

The first hydraulic mounting for the new battleships has been practically tested, and the mountings for the Majestic and Magnificent will be completed in 1895-96.

The electric motors for working the 10-in. guns on board the Barfleur have acted well, and give good promise for the future development of that system.

New Works.

In my statement last year I explained the reasons why extensive works connected with docks, harbours, and barracks were required. In carefully going over the proposals which were then sanctioned, some new works, and the extension of others already authorised, have been found to be necessary.

At Portland it is considered necessary to protect the eastern side of the harbour by a permanent breakwater, on the line of the present dolphins, so as to give more complete defence than was provided for by the dolphins, and to afford absolute protection against torpedo-boat attack. These dolphins are being completed as originally designed, and will form part of the permanent breakwater.

To obtain similar protection at Gibraltar, it is proposed still further to prolong the mole by an additional 3,200 feet in the form of a detached mole, and to close the northern entrance of the harbour so formed, either by dolphins or booms, or by a coaling pier for merchant ships, if such should be constructed by the colony.

As the Downs cannot now be used in time of war as an anchorage for the fleet, a protected harbour at Dover would be of great service to ships of the Royal Navy; it would also be invaluable as a harbour of refuge for merchant vessels. It is proposed to complete the harbour on the lines of the scheme recommended by the Royal Commission of 1844.

At Hong Kong the present dockyard is not sufficient for the increasing demands of the squadron on that distant but important station.

The proposal to erect naval barracks at Portsmouth is in continuation of the policy carried out at Keyham and Whale Island, and now being acted upon at Chatham. In addition to the better sanitary

arrangements, general comfort, and discipline of the men which barracks afford, it is necessary to remove the existing depôt hulks from the basins and elsewhere, where space for berthing sea-going vessels is much required.

It is proposed to meet the outlay for these and certain other permanent works already commenced by a loan.

Annual Bills will be presented to Parliament to provide the money required for the works to be carried out during the year, and in this way the control of Parliament will be effectively maintained over the expenditure.

A Bill, with a schedule of the proposed works, will be presented directly the first Navy Vote has received the sanction of the House of Commons.

It will include provision for work in 1895-96 on all the larger works sanctioned last Session, with the addition of the further works at Portland and Gibraltar.

The Works Vote in the Navy Estimates for the ensuing year has been framed in view of the adoption of this proposal, and does not include money which will be provided by loan.

The Vote is £103,000 less than last year, but a very large additional expenditure will be entailed for many years to come, on account of the works proposed to be carried out by loan. It must be observed that for many years this Vote has been kept extremely low, and if the safety and efficiency of the fleet are to be maintained these costly works cannot be postponed.

Works in Progress.

The new docks at Portsmouth are being advanced, and are expected to be completed in the course of next year.

At Gibraltar the extension of the Admiralty mole by 750 ft. is being made under contract. The further extension of the mole by 1600 ft. and the construction of the dock are being commenced by local labour under the Admiralty officers. Under an arrangement with the Treasury, a substantial sum was appropriated for the commencement of the further extension of the mole and of the dock during the current financial year. The necessary plant and material have been ordered, and are being shipped to Gibraltar, and arrangements have been made to proceed with the works.

At Portland harbour there has been some unavoidable delay, due to bad weather, in completing the coaling station and the temporary protection of the eastern side of the harbour; but both these services will be completed during the year.

As regards Keyham Dockyard extension, minor contracts have been entered into for certain portions of the work, and a contract will shortly be made for the remainder.

Considerable progress has been made in dredging at Portsmouth, Devonport, and Chatham, and the work is being continued.

Designs have been prepared for the new naval barracks at Chatham, and as soon as the necessary arrangements have been completed for the additional land required, the work will be commenced. It is further proposed to extend the hospital at Chatham, to meet the requirements of the largely increased number of seamen maintained in reserve at the port.

A contract has been made for the extension of the barracks at the Walmer Marine Depôt, and the work of enlarging the Engineer Students' College at Keyham will shortly be put in hand.

At Gibraltar and Malta the new works for the storage of ammunition are being carried out by the War Department. The Estimates have been revised to include an additional magazine at Gibraltar and certain additional works at Malta.

New Works in Estimates.

The principal new works to be commenced in the Estimates of 1895–96 are :—

Additional jetties at Portsmouth and Devonport. An extension of the coal store at Malta, to provide for the reserve coal for the Mediterranean fleet. A new electric shop at Portsmouth, and the widening of the caisson communication between the repairing and rigging basins.

A torpedo range is proposed at Portland, to give the necessary facilities for running and adjusting new torpedoes.

At Malta it has been found necessary to acquire certain lands in the vicinity of the new magazines, and the purchase price has been arrived at by agreement and by arbitration.

The rifle ranges, for which certain provision is made, include Sheerness, Devonport, and Walmer, and additions and alterations will be carried out at Malta and other foreign stations to adapt the existing ranges to the magazine rifle.

The defective water supply at Port Royal, Jamaica, has been much complained of by successive commanders-in-chief, and provision will be made this year to meet this want of our fleet in the West Indies.

Mobilization.

The united crews of ships commissioned for the partial mobilization of 1894 amounted to 9951, as compared with 9425 in 1893.

The arrangements for definitely appropriating petty officers and men of all ratings to the three home ports have now been completed, and the result of the general order that men were to elect the port division to which they wished to belong, will form a basis on which the future appropriation of new entries to the ports will be regulated. This will result eventually in each port having its fair proportion of the various ranks and ratings, the want of which has been much felt.

In order to prevent the inconvenience caused by the necessity of sending men round to the other ports to qualify as torpedo men, arrangements are now being made to carry out this instruction at Chatham-Sheerness.

For similar reasons arrangements have also been made for training the engine-room artificers in torpedo work at Devonport, with a view to gradually making each port self-supporting.

Royal Marines.

During the past financial year, 1870 recruits have been raised for this corps, bringing the numbers to within 50 of the increased establishment for which provision was voted.

Notwithstanding these large entries, the class of recruits has been quite up to the average; the height qualifying for admission has been maintained at an average of 5 ft. 6 in., the standard for the past four months for young men under 20 being fixed at 5 ft. 7 in., with the addition of ½ in. for recruits over that age. The recruits for the Royal Marine Artillery are well above the average, present entries being men of 5 ft. 9 in.

The whole of the corps on shore have been armed with the Lee-Metford rifle; the issue of the new arm to the men afloat and on distant stations will be gradually effected concurrently with the issues made to the seamen. Ranges suitable for the new arm are as yet available only at Eastney and Browndown, thus necessitating the moving of squads by rail from the other divisions, in order to carry out their practice at these places. It is hoped, however, that the Gravesend range will be made suitable for the Chatham Marines by the early summer.

The new swimming bath at Walmer is proving to be of considerable benefit. Formerly it was not possible to teach swimming during the winter and spring months, and the majority of young soldiers

completing their drills during that period were embarked without the opportunity of acquiring this art. Since July last, however, swimming has been taught daily, and the result is that very few of the Walmer men leave for service afloat who are unable to swim.

It has been found practicable to dispense with the further training of marines as naval signallers, as there are now a sufficient number of trained seamen signallers, but marines already qualified will continue to be employed.

The services of a detachment of 75 officers, non-commissioned officers, and men, Royal Marine Artillery, have been placed at the disposal of the Canadian Government for a period of five years. These men will be employed in conjunction with the Canadian forces at Esquimalt. The cost of their maintenance will be borne by the Dominion Government.

It is proposed to make a change in the recruiting service by gradually substituting retired officers on consolidated pay for officers on the active list. The latter will be of much use in doing duty with the corps, as the establishment of officers has been only slightly increased to meet the addition made to the men.

With the same object a number of officers on detached and special work have been seconded and their places filled by additional officers who will serve at the depôts and with their men.

Royal Naval Reserve.

The number of officers who have made themselves efficient by varying periods of service in the fleet is 283, against 248 at the end of last year.

The lists of executive officers are now full, and 104 eligible candidates for entry had to be refused in September last. The Registrar General has since received applications from 102 officers of the mercantile marine for entry into the Royal Naval Reserve. As regards engineer officers, the numbers enrolled are close upon those provided for in the Estimates of last year. The further increase of these officers, as well as a modification in the terms of their engagement, is now under consideration.

Arrangements have been made to enable officers to obtain a second year's training afloat. Hitherto it has been limited to one year on board a man-of-war.

The first and second class reserve men are practically up to the full numbers voted. Firemen attracted by the new regulations issued in 1893 have presented themselves in such numbers that the entry of men has had to be restricted to the very pick of the mercantile

marine; provision will be made in the coming Estimates to add 400 to the list, which will bring the total number of firemen up to 2000.

Up to 1889 difficulty was experienced in completing the force of the Royal Naval Reserve men to the number desired, but since then the applicants have been steadily increasing in number. This shows how popular the force has become among the seafaring population of the United Kingdom, and it may be confidently stated that under proper arrangements the force might be largely increased if the necessity should arise.

Provision was again made to embark 500 men for the naval manœuvres, and many more than that number volunteered for service. They were embarked in 40 different ships, and, on the whole, good reports were received both as regards conduct and efficiency.

Provision has also again been made for embarking Royal Naval Reserve men for six months' training in the fleet, and although the conditions of such service have only just been issued, 236 men have volunteered for the training.

A new Royal Naval Reserve drill battery has recently been opened at Renmore, county Galway, and one will shortly be completed at Appledore. It is also under consideration to erect two or three more batteries round the coast of the United Kingdom.

The goodwill of the shipping companies and owners has contributed materially to the steady progress of the Royal Naval Reserve, both as regards officers and men.

Very encouraging reports are constantly received from the drill ships and batteries as to the efficiency of Royal Naval Reserve officers and men, and there is much reason to be satisfied with the present condition of the force.

GENERAL.

Payment of Seamen's Allotments.

In consequence of representations of the inconvenience to the wives and relatives of seamen and marines in having to attend at the dockyards in order to receive the money allotted to them, a committee, presided over by Lord Farrer, was appointed to visit the principal naval ports, and to enquire into the matter.

The committee recommended that payment of the allotments should be made by means of Post Office Orders payable at the Money Order Office nearest to the residences of the allottees. This recommendation has been adopted and carried out with the co-operation of the Post Office.

The system has worked well, and there is every reason to believe that it has been greatly appreciated by those drawing allotments.

Dockyard and Marine Division Schools.

A Committee, under the presidency of Sir Robert Hamilton, was appointed last year to enquire into the present condition of the schools in the dockyards and at the Royal Marine Divisions.

The Committee arrived at the opinion that the schools established in the dockyards for the benefit of the apprentices are doing an important public service and should be maintained. Certain recommendations made by the Committee are being carried out.

With reference to the elementary schools at the Royal Marine divisions, the Committee, while recommending the maintenance of the schools, were of opinion that their conditions should be modified in view of recent legislation in regard to public elementary education. They accordingly suggested various changes for the purpose of bringing the Marine Schools into closer touch with the Education Department. In consequence, arrangements have been made to bring these schools under the inspection of the Committee of Council for Education, and for the payment of a grant in aid of the schools on the same conditions as in public elementary schools.

This will effectually test the efficiency of the education given in these schools, and ensure that the system is maintained in harmony with that of the rest of the country.

The financial result will be a transfer of part of the cost of these schools from Navy to Education Votes.

Ships in Commission.

The number of ships in commission has been slightly increased. For better ensuring the protection of British interests during the hostilities between China and Japan, the China Squadron has been temporarily increased by the first-class cruiser Edgar and the second-class cruiser Spartan—ordered from the Mediterranean—and by the first-class gunboats Pigeon and Redbreast from the East Indies.

The place of the Pigeon in the East Indies was taken temporarily by the Bramble from the Mediterranean, while the latter has been replaced by the Hebe.

Of the flag-ships abroad, the first-class ironclad Centurion has taken the place of the Imperieuse in China, the second-class cruiser Bonaventure that of the Boadicea in the East Indies, and the first-class cruiser St. George that of the Raleigh at the Cape.

New Training Ship.

A recent examination into recruiting for the Navy has pointed to the desirability of establishing another training ship.

The experimental cruise of the Northampton round the coast of Ireland last year attracted a certain number of Irish boys into the Navy.

Following the step taken in 1892, in commissioning the Caledonia for the boys entered from Scotland and the North of England, it is contemplated to station a Boys' Training Ship at Queenstown.

This harbour presents decided advantages for the training of boys for the Navy. It is a Naval Station, and besides having a mild climate, is admirably suited for instruction in boating and sailing.

The details of the proposal are not yet worked out, but I hope before long to be able to announce that the necessary arrangements have been made.

As I have explained elsewhere, the Northampton will include Irish ports in her coming cruise round the coasts of the United Kingdom, and thus bring other parts of Ireland into touch with the Naval Training Service.

Spencer.

28*th February*, 1895.

Abstract of Navy Estimates for 1895-96.

Votes.		Estimates, 1895-96. Gross Estimate.	Estimates, 1895-96. Appropriations in Aid.	Estimates, 1895-96. Net Estimate.	Estimates, 1894-95. Gross Estimate.	Estimates, 1894-95. Appropriations in Aid.	Estimates, 1894-95. Net Estimate.	Difference on Net Estimates. Increase.	Difference on Net Estimates. Decrease.	Votes.
	I.—NUMBERS.			Total Numbers.			Total Numbers.	Numbers.	Numbers.	
A.	Total Number of Officers, Seamen, Boys, Coastguard, and Royal Marines	....	....	88,850	....	....	83,400	5,450	....	A.
	II.—EFFECTIVE SERVICES.	£	£	£	£	£	£	£	£	
1	Wages, &c., of Officers, Seamen and Boys, Coastguard, and Royal Marines	4,262,383	128,883	4,133,500	4,048,336	129,836	3,918,500	215,000	....	1
2	Victualling and Clothing for the Navy	1,738,754	371,654	1,367,100	1,764,074	361,974	1,402,100	....	35,000	2
3	Medical Establishments and Services	175,731	24,331	151,400	168,797	24,897	143,900	7,500	....	3
4	Martial Law	10,627	27	10,600	10,617	17	10,600	....	....	4
5	Educational Services	106,727	27,327	79,400	105,010	25,910	79,100	300	....	5
6	Scientific Services	72,197	10,797	61,400	71,177	9,577	61,600	....	200	6
7	Royal Naval Reserves	215,633	33	215,600	205,868	68	205,800	9,800	....	7
8	Shipbuilding, Repairs, Maintenance, &c.:									8
	Section I.—Personnel	1,824,995	14,995	1,810,000	1,797,835	26,035	1,771,800	38,200	....	Sec. I.
	Section II.—Matériel	2,803,000	148,000	2,655,000	2,529,000	235,000	2,294,000	361,000	....	Sec. II.
	Section III.—Contract Work	3,455,640	39,640	3,416,000	2,959,700	39,500	2,920,200	495,800	....	Sec. III.
9	Naval Armaments	1,742,711	49,511	1,693,200	1,433,200	50,000	1,383,200	310,000	....	9
10	Works, Buildings, and Repairs at Home and Abroad	554,500	7,500	547,000	662,500	12,500	650,000	....	103,000	10
11	Miscellaneous Effective Services	186,514	9,714	176,800	183,625	9,825	173,800	3,000	....	11
12	Admiralty Office	245,720	8,520	237,200	239,720	8,520	231,200	6,000	....	12
	Total Effective Services £	17,395,132	840,932	16,554,200	16,179,459	933,659	15,245,800	1,446,600	138,200	
	III.—NON-EFFECTIVE SERVICES.									
13	Half-Pay, Reserved, and Retired Pay.	774,276	12,976	761,300	769,950	12,950	757,000	4,300	....	13
14	Naval and Marine Pensions, Gratuities, and Compassionate Allowances	1,031,327	23,427	1,007,900	1,013,871	23,471	990,400	17,500	....	14
15	Civil Pensions and Gratuities	317,786	486	317,300	313,133	533	312,600	4,700	....	15
	Total Non-Effective Services £	2,123,389	36,889	2,086,500	2,096,954	36,954	2,060,000	26,500	....	
	IV.—EXTRA ESTIMATE FOR SERVICES IN CONNECTION WITH THE COLONIES.									
16	Additional Naval Force for Service in Australasian Waters—Annuity payable under	95,300	35,000	60,300	95,300	35,000	60,300	....	....	16
	GRAND TOTAL £	19,613,821	912,821	18,701,000	18,371,713	1,005,613	17,366,100	1,473,100	138,200	

Net Increase £1,334,900

STATEMENT showing the Actual and Estimated EXPENDITURE for NAVAL SERVICES for the Three Years ending the 31st March 1896.

		£	s.	d.
1893–94	Estimated Expenditure (after deducting Appropriations in Aid)	14,240,100	0	0
	Net Expenditure, as per Final Account	14,306,546	11	6
	Net (Expenditure more than Estimate)	£66,446	11	6
1894–95	Estimated Expenditure (after deducting Appropriations in Aid)	£17,366,100	0	0
1895–96	Estimated Expenditure (after deducting Appropriations in Aid)	£18,701,000	0	0

STATEMENT of the Principal Points of DIFFERENCE between the ESTIMATES of 1894–95 and those for 1895–96.

INCREASES.		£
Wages, &c., of Officers, Seamen, and Marines		215,000
Medical Establishments and Services		7,500
Royal Naval Reserves		9,800
Wages of Artificers, &c., in Dockyards at Home and Abroad		40,309
Naval Stores		330,264
Decrease in amount of Receipts arising from the Sale of Old Ships		26,000
Hulls of Ships (Contract)		505,560
Repairs, &c., of Ships and Machinery (Contract)		15,750
Inspection of Contract Work		4,000
Gun Mountings and Air Compressing Machinery (Contract)		53,012
Machinery for Shore Establishments (Contract)		15,000
Royal Reserve of Merchant Cruisers		11,473
Wages of Artificers employed in Naval Ordnance Establishments		7,783
Guns, Projectiles, Ammunition, Small Arms, and Miscellaneous		302,819
Piloting and Towing Her Majesty's Ships		2,600
Non-Effective Services		27,267
Miscellaneous Items		7,539
DECREASES.	£	1,581,076
Victualling and Clothing	31,000	
Machinery for Her Majesty's Ships (Contract) (Net)	38,359	
Interest on Advances under Naval Defence Act, 1889	70,636	
Torpedoes and Gun Cotton	1,381	
Works, Buildings, and Repairs	103,000	
Passage Money and Conveyance of Officers, Seamen, &c.	1,800	
		246,176
Net Increase	£	1,334,900

STATEMENT showing the Total Estimated EXPENDITURE for the NAVAL SERVICE, including Amounts provided in the NAVY ESTIMATES, as well as in the CIVIL SERVICE and other ESTIMATES, for the following Services:—

——		1895–96.	1894–95.
NAVY ESTIMATES:		£	£
Estimated Expenditure (after deducting Appropriations in Aid)		18,701,000	17,366,100
CIVIL SERVICE ESTIMATES:			
Estimated Expenditure under—			
Class I. Vote 4.—Admiralty, Extension of Buildings (Net)		24,200	39,200
" I. " 9.—Public Buildings, Great Britain:	£		
Maintenance and Repairs, including New Works, Alterations, &c. . . .	3,430		
Rents, Insurance, Tithes, &c. .	4,500		
Fuel, Light, Water, &c.	3,500		
Furniture . .	1,300		
		12,730	11,450
Class I. Vote 10.—Surveys of the United Kingdom		100	300
" I. " 13.—Rates on Government Property		59,800	55,800
" I. " 14.—Public Buildings, Ireland:			
Coast Guard, viz.:	£		
Purchase of Sites .	—		
New Works and Alterations, including Naval Reserve Stations . .	8,690		
Maintenance and Supplies .	6,286		
Furniture, Fittings, &c.	10		
	£14,986		
Naval Reserve, viz.:			
Maintenance and Supplies .	241		
		15,227	14,229
Class II. Vote 8.—Board of Trade:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force . .		3,450	3,325
Class II. Vote 14.—Exchequer and Audit Department (Cost of Audit):	£		
Navy Cash Accounts	7,029		
Expense and Manufacturing Accounts . .	5,454		
Store Accounts .	4,882		
		17,365	16,989
Class II. Vote 23.—Stationery and Printing . .		63,000	65,000
" III. " 1.—Law Charges, England (Net) .		3,348	3,541
" III. " 8.—Prisons, England and the Colonies:			
Maintenance of Naval Prisoners		1,395	1,538
" III. " 14.—Prisons, Scotland . . .		48	60
" III. " 21.—Prisons, Ireland . . .		48	52
REVENUE DEPARTMENTS:			
Post Office.—Postage of Official Correspondence (including Parcels) . .	£ 11,960		
" Official Telegrams . .	3,050		
		15,010	14,570
Total . . . . . £		18,916,721	17,592,154

VOTE (A.)

NUMBERS

Of all Ranks for whom Provision is made in the Navy Estimates, 1895–96.

I.—Available for Sea Service . . . 81,508 } 88,850
II.—Other Services . . . . . . 7,342 }

Eighty-eight Thousand Eight Hundred and Fifty.

I.—Available for Sea Service.

Under which Vote Provided.	Ranks, &c.	Numbers, All Ranks. 1895–96.		1894–95.		Average Numbers of all Ranks borne during the Year 1894.
	For Her Majesty's Fleet (including Indian Troop Ships).					
Vote 1	Flag Officers	14		14		
	Commissioned Officers	3,073		2,905		
	Subordinate Officers	568		572		
	Warrant Officers	1,101		1,006		
	Petty Officers and Seamen	51,995		48,035		
	Boys	5,194	61,945	4,494	57,026	53,744
	Coast Guard.					
	Commissioned Officers	89		89		
	Chief Officers of Stations	231		232		
	Petty Officers and Seamen	3,880	4,200	3,879	4,200	4,058
	Royal Marines (for Service Afloat and on Shore).					
	Commissioned Officers	358		358		
	Warrant Officers	28		28		
	Staff Sergeants and Sergeants	1,173		955		
	Buglers and Musicians	602		602		
	Rank and File	13,202	15,363	13,422	15,365	15,063
	Total numbers available for Sea Service		81,508		76,591	72,865

Net Increase in Numbers . . . 4,917

II.—Other Services.

Under which Vote Provided.	Ranks, &c.	1895–96.		1894–95.		Average 1894.
Vote 1	Naval Cadets	280		270		
	Engineer Students	172		158		
	Pensioners in Home Ships and in the Reserves	1,290		1,213		
	Boys under Training	4,600	6,342	4,200	5,841	6,029
Other Votes	Various Services	..	1,000	..	968	968
	Total numbers for other Services		(a)7,342		(a)6,809	6,997

Net Increase in Numbers . . . 533

	1895–96		1894–95
(a) Including Officers and Seamen	2,599	—	2,468
,, Boys	4,601	—	4,201
,, Royal Marines	142	—	140
	7,342	—	6,809

VOTE 8.

SHIPBUILDING, REPAIRS, MAINTENANCE, &c.

I.—ESTIMATE of the SUM which will be required, in the YEAR ending 31st March, 1896, to defray the EXPENSES of SHIPBUILDING, REPAIRS, MAINTENANCE, &c., including the COST of ESTABLISHMENTS of DOCKYARDS and NAVAL YARDS at HOME and ABROAD.

DOCKYARD WORK.

SECTION I.—PERSONNEL.—One Million Eight Hundred and Ten Thousand Pounds.

(£1,810,000.)

SECTION II.—MATÉRIEL.—Two Million Six Hundred and Fifty-five Thousand Pounds.

(£2,655,000.)

CONTRACT WORK.

SECTION III.—CONTRACT WORK.—Three Million Four Hundred and Sixteen Thousand Pounds.

(£3,416,000.)

II.—SUB-HEADS under which SECTION I., PERSONNEL, of this VOTE will be accounted for.

	ESTIMATES.		Increase.	Decrease.
	1895–96.	1894–95.		
	£	£	£	£
DOCKYARD WORK.				
SECTION I.—PERSONNEL.				
Dockyards at Home.				
A.—Salaries and Allowances	159,418*	160,325	..	907
B.—Wages, &c., of Men, and hire of Teams	1,394,522	1,370,202	24,320	..
C.—Wages, &c., of Police Force	38,062	38,142	..	80
D.—Contingencies	5,200	4,935	265	..
Naval Yards Abroad.				
E.—Salaries and Allowances	52,272*	52,859	..	587
F.—Wages, &c., of Men, and hire of Teams	164,478	159,529	4,949	..
G.—Wages, &c., of Police Force	10,113	10,913	..	800
H.—Contingencies	930	930	..	..
£.	1,824,995	1,797,835	29,534	2,374
Deduct,—			*Add*,—	
I.—Appropriations in Aid	14,995	26,035	11,040	..
£.	1,810,000	1,771,800	40,574	2,374

Net Increase . . £38,200

* These amounts include the sums of £12,243 and £1,182 for pay of Inspectors of Shipwrights at Home and Abroad respectively, which is charged direct to the cost of shipbuilding.

NOTE.—Provision has been made for New Construction in the above Vote to the extent of—

	Further Programme (including Small Craft).
Section 1	£857,430
„ 2	1,390,560
„ 3	3,145,652
	£5,393,642

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION II., MATÉRIEL, of this VOTE will be accounted for.

———	ESTIMATES. 1895–96.	ESTIMATES. 1894–95.	Increase.	Decrease.
	£	£	£	£
DOCKYARD WORK—*continued.*				
SECTION II.—MATÉRIEL.				
Naval Stores.				
A.—Timber, Masts, Deals, &c. . .	152,000	155,000	..	3,000
B.—Metals and Metal Articles . .	1,427,174	1,115,270	311,904	..
C.—Coals for Yard purposes . . .	58,000	62,000	..	4,000
D.—Hemp, Canvas, &c.	165,000	135,000	30,000	..
E.—Paint Materials, Oils, Pitch, Tar, Tallow, Boats, Furniture, and other Miscellaneous Articles. . .	360,000	385,000	..	25,000
F.—Electrical, Torpedo, and other Apparatus	100,000	90,000	10,000	..
G.—Coals for Steam Vessels . . .	475,000	534,000	..	59,000
H.—Freight.	35,000	32,000	3,000	..
I.—Rents, Water, &c., Dockyards at Home, and Naval Yards Abroad . .	18,811	9,670	9,141	..
K.—Gas, &c., Dockyards at Home, and Naval Yards Abroad . . .	12,015	11,060	955	..
£	2,803,000	2,529,000	365,000	91,000
Deduct,—				
L.—Appropriations in Aid	148,000	235,000	..	87,000
£	2,655,000	2,294,000	365,000	4,000
	Net Increase *		£361,000	

* This Vote is increased by a transfer of £4,000 from Vote 2. The real increase is, therefore, £357,000.

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued*.

II.—SUB-HEADS under which SECTION III., CONTRACT WORK, of this VOTE will be accounted for.

——	ESTIMATES.		Increase.	Decrease.
	1895–96.	1894–95.		
	£	£	£	£
SECTION III.—CONTRACT WORK.				
A.—Propelling Machinery for Her Majesty's Ships and Vessels	1,186,685	1,227,615	..	40,930
B.—Auxiliary Machinery for Her Majesty's Ships and Vessels	45,575	43,004	2,571	..
C.—Hulls of Ships, &c., Building by Contract	1,610,534	1,104,974	505,560	..
D.—Purchase of Ships, Vessels, &c.	..	..	..	..
E.—Repairs and Alterations by Contract of Ships, &c., and their Machinery and Stores	75,190	59,300	15,890	..
F.—Inspection of Contract Work	35,000	31,000	4,000	..
G.—Gun Mountings and Air Compressing Machinery	412,183	359,171	53,012	..
H.—Machinery for Her Majesty's Shore Establishments at Home and Abroad	45,000	30,000	15,000	..
I.—Royal Reserve of Merchant Cruisers	45,473	34,000	11,473	..
J.—Interest on Advances under Naval Defence Act, 1889	..	70,636	..	70,636
£	3,455,640	2,959,700	607,506	111,566
Deduct,—				
K.—Appropriations in Aid	39,640	39,500	140	..
£	3,416,000	2,920,200	607,366	111,566
	Net Increase		£495,800 (*a*)	

(*a*) The provision on account of the Interest on Advances under the Naval Defence Act (Sub-head J) having been transferred to the Treasury (Finance Act, 1894), the real increase on this Section is £566,436.

PROGRAMME of the ESTIMATED EXPENDITURE in CASH, and in NET REPAIRS, MAINTENANCE, &c.,

SUB-HEADS under which this ESTIMATED EXPENDITURE will be provisions of Sec. 1 (2), ARMY

	ESTIMATES, Direct Expenditure. Dockyard Work. Personnel, Sec. I.	Matériel, Sec. II.	Contract Work, Sec. III.	Total Direct Expenditure. (A)
	£	£	£	£
NEW CONSTRUCTION:				
Naval Defence Act:				
Hulls, Machinery, &c.:				
Dockyard-built Ships, Sec. 1 (3) (*b*)	..	..	..	..
Contract-built Ships, Sec. 1 (3) (*b*) (Fitting and Equipping at Dockyards)	..	..	..	..
Contract-built Ships, Sec. 1 (3) (*a*)	..	..	..	..
A.—DOCKYARD-BUILT SHIPS—				
Hulls, &c. (*c*)	766,100	1,338,660	280,900	2,385,660
Machinery	51,245	26,705	371,176	449,126
	817,345	**1,365,365**	**652,076**	**2,834,786**
B.—CONTRACT-BUILT SHIPS—				
Hulls, &c. (*c*)	38,785	23,550	1,690,138	1,752,473
Machinery	..	..	783,493	783,493
	38,785	**23,550**	**2,473,631**	**2,535,966**
C.—SMALL VESSELS (*d*)	1,300	1,645	19,945	22,890
TOTAL NEW CONSTRUCTION	**857,430**	**1,390,560**	**3,145,652**	**5,393,642**
D.—RE-CONSTRUCTION, REPAIRS, ALTERATIONS, &c.	..	..	..	733,249
E.—SEA STORES, COALS, &c.	..	..	..	1,004,482
F.—ESTABLISHMENT, INCIDENTAL, AND MISCELLANEOUS CHARGES, UNAPPROPRIATED	..	..	..	..
			£	**7,131,373**

(*c*) Including Hydraulic and Transferable Gun Mountings, &c.
(*d*) Including Harbour Craft, and excluding Torpedo Boats, &c., the value of which is included under Sub-Heads A, B, and D.

VALUES OF STORES issued for SHIPBUILDING, RE-CONSTRUCTION, in the Year 1895–96.

accounted for in the NAVY EXPENSE ACCOUNTS, under the AND NAVY AUDIT ACT, 1889.

1895–96.		1894–95.			Difference between Direct Expenditure, 1894–95 (B) and 1895–96 (A).	
Establishment, &c., Charges, apportioned.	Aggregate, 1895–96.	Direct Expenditure. (B)	Establishment, &c., Charges, apportioned.	Aggregate, 1894–95.	Increase.	Decrease.
£	£	£	£	£	£	£
..	..	287,625	45,525	333,150	..	287,625
..	..	4,518	92	4,610	..	4,518
..	..	9,495	..	9,495	..	9,495
255,231	2,640,891	1,708,034	174,456	1,882,490	677,626	..
21,328	470,454	316,182	22,508	338,690	132,944	..
276,559	**3,111,345**					
44,075	1,796,548	1,199,308	30,233	1,229,541	553,165	..
15,356	798,849	927,214	19,000	946,214	..	143,721
59,431	**2,595,397**					
388	23,278	68,329	1,853	70,182	..	45,439
336,378	**5,730,020**	**4,520,705**	**293,667**	**4,814,372**	**872,937**	..
73,789	807,038	785,458	80,632	866,090	..	52,209
41,543	1,016,025	986,191	45,676	1,031,867	18,291	..
982,385	982,385	..	1,223,049	1,223,049	..	..
1,434,095	**8,565,468**	**6,292,354**	**1,643,024**	**7,935,378**		

NET INCREASE ON DIRECT EXPENDITURE . . £839,019.

RECAPITULATION OF ESTIMATED EXPENDITURE.

HEADS OF EXPENDITURE.	ESTIMATED EXPENDITURE.		ESTIMATED DISTRIBUTION OF THE DIRECT AND INCIDENTAL EXPENDITURE.							
			Naval Construction.					Establishment and Incidental Charges Unapportioned to Ships, &c.		
				Re-construction, Repairs, Alterations, and Refits.						
	Charged direct as Incurred.	Establishment and Incidental Charges Apportioned.	New Construction.	Ships Re-constructing.	Ships for Reliefs, or Re-commission.	Ships in Commission and Reserve.	Stores for Ships, Coals for Steaming, &c.	Fleet, Port, National, and Unappropriated Charges.	Unappropriated Charges (Haulbowline, Deptford, and Naval Yards Abroad).	Total Amount of Estimated Expenditure.
	(a.)	(b.)	(c.)	(d.)	(e.)	(f.)	(g.)	(h.)	(i.)	(k.)
SUB-HEADS OF EXPENDITURE.			A., B., and C.	D.			E.	F.		
	£	£	£	£	£	£	£	£	£	£
SECTION I.—DOCKYARD WORK. PERSONNEL .	1,203,265	798,253	1,046,453	22,312	116,684	254,867	30,307	367,348	163,547	2,001,518
SECTION II.—DOCKYARD WORK. MATÉRIEL .	2,594,120	480,611	1,476,293	10,275	65,366	158,544	1,003,236	222,670	176,577	3,074,731
SECTION III.—CONTRACT WORK . .	3,333,988	155,231	3,207,274	12,574	37,681	128,735	12,482	52,243	..	3,489,219
TOTAL ESTIMATED EXPENDITURE for 1895-96 . . . . . . £	7,131,373	1,431,095	5,730,020	45,161	219,731	542,146	1,046,025	642,261	340,124	8,565,468
TOTALS OF SUB-HEADS £	8,565,468		5,730,020	807,038			1,046,025	982,385		8,565,468

Explanatory Observations on the Navy Estimates by the Financial Secretary.

Vote A.—The following table shows the growth of numbers during six years :—

1890–91.	1891–92.	1892–93.	1893–94.	1894–95.	1895–96.
Numbers.	Numbers.	Numbers.	Numbers.	Numbers.	Numbers.
68,800	71,000	74,100	76,700	83,400	88,850

The increase in 1895–96 includes the addition of 1421 seamen, and 1919 engine-room ratings.

Royal Naval Reserves.

Vote 7.—Provision has been made for considerable additions both of officers and men to the Royal Naval Reserves.

Dockyard Shipbuilding (including Armaments) Naval Defence Acts, 1889 and 1893.

Votes 8 and 9.—The actual and estimated expenditure under the Naval Defence Acts for the purpose of Dockyard Shipbuilding (*a*), in accordance with the Schedule of the Naval Defence Act, 1889, and for the purpose of the armament of the Dockyard vessels, is as follows :—

Expenditure.	Shipbuilding.	Armaments.	Total.
	Vote 8.	Vote 9.	
	£	£	£
Actual Expenditure to 31st March, 1894	9,525,488	2,168,828	11,694,316
Anticipated Expenditure, 1894–95 .	308,223	239,172	547,395
Estimated Total . £	9,833,711	2,408,000	12,241,711
Statutory Limit (Naval Defence Act, 1889)	8,650,000	2,850,000	11,500,000
Amended Statutory Limit (Naval Defence Act, 1893)	10,000,000	2,850,000	12,850,000
Estimated Difference between £ Amended Limit and Expenditure	166,289 Less than Limit.	442,000 Less than Limit.	608,289 Less than Limit.

(*a*) This includes completing for sea in the dockyards the contract vessels (Naval Defence Act, 1889, Sect. 1 (3 *b*)).

In addition to the above expenditure under the Acts, the sum of £1,924,472 was spent under the proviso of Sub-section 1 of Section 3 of the Naval Defence Act, 1889, in the years 1889–90 to 1893–94, in "completing for sea the vessels not mentioned in the Schedule to the Act, which were already begun before" 1st April, 1889. The statutory limit of £10,000,000 does not apply to expenditure on these Old Programme vessels.

CONTRACT SHIPBUILDING (INCLUDING ARMAMENTS), NAVAL DEFENCE ACT, 1889.

The cost of these vessels and of their armaments is not provided in the Navy Estimates, but is met out of the charge of £1,428,571 made annually on the Consolidated Fund during the seven years ending 31st March, 1896.

The account for these vessels stands as follows :—

	Shipbuilding.	Armaments.	Total.
	£	£	£
Actual Expenditure to 31st March, 1894 .	8,302,472	1,671,837	9,974,309
Anticipated Expenditure in 1894–95 .	29,365	3,432	32,797
Total . . . . £	8,331,837	1,675,269	10,007,106

It is anticipated that the excess of £7106 over the statutory limit of £10,000,000 will disappear when the charges for Armament are revised, and finally distributed between Navy Votes and the Special Fund.

FURTHER PROGRAMME, *i.e.* DOCKYARD AND CONTRACT SHIPBUILDING (INCLUDING ARMAMENTS) NOT UNDER NAVAL DEFENCE ACT, 1889.

	Shipbuilding.	Armaments.	Total.
	£	£	£
Actual Expenditure :—			
1892–93	118,891	12,000	130,891
1893–94	919,450	118,000	1,037,450
Anticipated Expenditure, 1894–95 .	(*a*) 4,333,771	386,000	4,719,771
Estimated Expenditure, 1895–96 . .	5,393,642	730,000	6,123,642
£	10,765,754	1,246,000	12,011,754

The Naval Defence Acts, 1889 and 1893, expire on 31st March, 1895 ; consequently the aggregate expenditure upon New Construction during 1895–96 is provided for in these Estimates.

20th February, 1895. UGHTRED J. KAY-SHUTTLEWORTH.

(*a*) It is estimated that the Programme expenditure (per Expense Accounts) will be £4,188,557, to which has been added the sum of £145,214, paid as advances on Transferable Gun Mountings in course of manufacture. These mountings will not be delivered until subsequent years, when their value will be charged to ships in the Expense Accounts.

LIST of NEW SHIPS and VESSELS Estimated to be passed into the FLEET RESERVE during the Years 1895–96 and 1894–95.

1895–96.

Name of Ship.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.
ARMOURED SHIPS:			
Nil.	..	..	..
PROTECTED SHIPS:			
Nil.	..	..	..
UNPROTECTED SHIPS:			
Torch (Sloops)	960	1,400	6
Alert (Sloops)	960	1,400	6
Phœnix (Sloops)	1,050	1,400	6
Algerine (Sloops)	1,050	1,400	6
Torpedo Boat Destroyers, 24 No.	various		6

1894–95.

Name of Ship.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.
ARMOURED SHIPS:			
Nil.	..	..	..
PROTECTED SHIPS:			
Charybdis (Cruisers, Second Class)	4,360	9,000	10
Forte (Cruisers, Second Class)	4,360	9,000	10
Fox (Cruisers, Second Class)	4,360	9,000	10
Flora (Cruisers, Second Class)	4,360	9,000	10
Hermione (Cruisers, Second Class)	4,360	9,000	10
UNPROTECTED SHIPS:			
Halcyon (Torpedo Gunboats, First Class)	1,070	3,500	2
Harrier (Torpedo Gunboats, First Class)	1,070	3,500	2
Hussar (Torpedo Gunboats, First Class)	1,070	3,500	2
Torpedo Boat Destroyers, 18 No.	various		4 to 6

PROPOSED NAVAL WORKS.

The following statement of proposed Naval Works, drawn up by the Admiralty, has been issued as a Parliamentary paper :—

New Works.	Total Estimated Expenditure.	
	Already sanctioned by Parliament.*	New Proposals.
(A) Enclosure and Defence of Harbours against Torpedo Attack :—		
Gibraltar—	£	£
Completion of present Mole	63,000	—
Extension of ,, ,,	310,000	—
Detached Mole	..	585,000
Deepening Harbour	..	48,000
Dolphins	..	48,000
Portland—		
Breakwater	..	650,000
Dover—		
Breakwater, &c.	..	1,920,000
	373,000	3,251,000
(B) Adapting Naval Ports to present Needs of Fleet :—		
Deepening Harbours and Approaches	855,000	—
Keyham Dockyard Extension	1,920,000	—
Portsmouth Docks	239,000	—
Gibraltar Dock	361,000	—
Hongkong Dockyard Extension	..	290,000
	3,375,000	290,000
(C) Naval Barracks, &c. :—		
Chatham Naval Barracks	347,000	—
Portsmouth ,, ,,	..	595,000
Walmer Marine Depôt (Extension)	20,000	—
Keyham Engineers' College (Extension)	30,000	—
	397,000	595,000
(D) Superintendence and Miscellaneous Charges	121,000	179,000
	4,266,000	4,315,000
	£8,581,000	

* The figures given in this column are the estimates for these works, after deducting the estimated expenditure up to the end of 1894–5, as shown in Parliamentary Return No. 216 of 1894.

French Navy Estimates for the Years 1895 and 1894.

Cap.	Heads of Expenditure.	Credits proposed for the year 1895.	Credits proposed for the year 1894.
		£	£
	PERSONNEL.		
1	Admiralty Office	61,179	61,179
2	Navy Pay	1,676,134	1,655,367
3	Marines	517,566	470,676
4	Gendarmerie Maritime	31,653	32,453
5	Inspection of Administrative and Financial Service	10,349	10,349
6	Construction Staff	81,825	81,720
7	Administrative Staff	299,231	299,787
8	Medical Staff	85,036	86,878
	LABOUR.		
	Wages—		
9	Shipbuilding; new ships; constructions; fitting for sea	473,610	478,960
10	Shipbuilding; repairs	257,180	249,200
11	Armaments; construction of new guns	45,831	45,080
12	Armaments; repairs	55,878	54,930
13	Works	40,012	40,012
14	Victualling	18,894	18,230
15	Master-attendants' and Storekeepers' Departments	255,976	256,472
16	Miscellaneous	14,670	14,670
	MATÉRIEL.		
	Stores and Supplies—		
17	Admiralty	9,472	9,472
18	Ships fitting for sea; repairs	532,673	534,317
	Carried forward	£4,467,199	£4,399,752

Cap.	Heads of Expenditure.	Credits proposed for the year 1895.	Credits proposed for the year 1894.
		£	£
	Brought forward . .	4,467,199	4,399,752
	MATÉRIEL—*continued.*		
	Stores and Supplies—*continued.*		
19	Shipbuilding; contracts for new ships .	1,339,760	1,426,760
	Supplementary for ditto . . .	140,000	264,000
20	Shipbuilding; new ships; conversions; fitting for sea	1,080,000	880,000
21	Armaments; manufacture of new guns .	280,000	300,000
	Supplementary for ditto . . .	40,000	40,000
22	Armaments; repairs	576,000	593,101
23	Torpedoes	154, 487	159,760
24	Works; new and large alterations. .	176,167	169,573
	Ditto Supplementary for Defence of Military Ports	200,000	180,000
25	Works; repairs	53,200	53,200
26	Clothing	198,324	196,608
27	Victualling.	949,575	984,779
28	Barracks	39,722	38,882
29	Medicines	63,661	64,083
30	Machinery	256,565	219,339
31	Fuel and Lighting	31,681	30,869
32	Office Furniture	42,541	42,496
	MISCELLANEOUS.		
33	Travelling expenses and freight . . .	110,134	110,134
34	Allowance for lodging	155,744	146,144
35	Charitable	51,649	49,662
36	Pensions to Seamen	393,939	340,819
37	Secret Service	4,000	2,600
38	Miscellaneous	10,300	10,300
	Total . . .	£10,814,648	£10,702,861

PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1895.—BUILDING IN DOCKYARDS.

Class.	Names of Ships.	Where Building.	Date of Order for Building.	Probable Date of Completion.	Total Estimated Cost.	Expenditure proposed for 1895.
					£	£
Battleships	Brennus	Lorient	Jan. 1889	June 1894.	991,767	14,383
	Charles Martel	Brest	Aug. 1891	Commencement 1896	1,093,910	261,512
	Carnot	Toulon	July 1891	Commencement 1896	1,097,490	268,717
	Bouvet	Lorient	Jan. 1893	End 1897	1,087,434	203,279
	Charlemagne	Brest	..	,, 1898	1,100,535	161,186
	Saint-Louis	Lorient	..	,, 1898	1,100,535	148,337
	Gaulois (A 7)	..	..	..	1,100,535	47,269
Coast Defence Iron-clad	Tréhouart	Lorient	Oct. 1889	July 1895	582,586	77,945
Armoured Cruisers, First class	Dupuy-de-Lôme	Brest	July 1888	1st Quarter 1895	539,967	24,065
	Charner	Rochefort	Jan. 1891	July 1894	395,054	12,083
	Bruix	Rochefort	Nov. 1891	Mar. 1895	396,398	58,432
Second-class Protected Cruisers	Pascal	Toulon	Dec. 1893	July 1897	327,405	49,870
	Bugeaud	Cherbourg	April 1892	Aug. 1895	315,770	33,695
	Chasseloup-Laubat	Cherbourg	Oct. 1891	End 1894	312,228	17,460
	Friant	Brest	Dec. 1891	June 1894	308,765	41,901
	Du Chayla	Cherbourg	Mar. 1894	End 1896	324,529	101,682
	Cassard	Cherbourg	..	,, 1897	324,529	61,599
Third-class Protected Cruisers	Galilée	Rochefort	..	,, 1896	209,798	62,600
	Lavoisier	Rochefort	..	July 1897	203,038	44,189
Torpedo Cruiser	Fleurus	Cherbourg	Mar. 1891	1st Quarter 1895	123,047	13,566
Gun-vessel	Raymond (S 2)	..	..	..	96,288	11,506
Aviso Transport	Vaucluse	Rochefort	May 1886	End 1898	77,634	—
Submarine Boat	Morse	Cherbourg	..	Sept. 1895	31,452	11,547
TOTAL CONSTRUCTION IN DOCKYARDS				£	12,140,694	1,726,823

AUTHORISED PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1895.—BUILDING BY CONTRACT.

Class.	Names of Ships.	Contractors.	Date of Contract.	Date of Completion.	Total Estimated Cost.	Expenditure proposed for 1895.
					£	£
Battleships . .	Jauréguiberry .	Soc. de la Méditerranée . .	April 8, 1891	Aug. 1, 1895	1,071,784	149,401
	Masséna . . .	Soc. de la Loire	May 18, 1892	Mar. 6, 1897	1,097,529	335,700
Coast Defence Ironclads . .	Bouvines . .	Soc. de la Méditerranée . .	Dec. 18, 1889	July 1, 1894	615,390	47,520
	Valmy . . .	Soc. de la Loire	Dec. 18, 1889	June 18, 1894	585,854	59,519
Armoured Cruisers First-class	Chanzy . . .	Soc. de la Gironde	Dec. 18, 1889	..	415,075	24,719
	Pothuau . . .	Soc. de la Méditerranée . .	Jan. 11, 1893	May 20, 1896	446,257	127,532
	D'Entrecasteaux	Soc. de la Méditerranée . .	Nov. 8, 1893	Sept. 1, 1897	680,747	234,935
Fast Cruisers .	No. 1 . . .	..	..	..	734,765	28,000
	No. 2 . . .	..	..	..	734,765	28,000
Second-class Protected Cruisers	Descartes . .	Soc. de la Loire	Aug. 17, 1892	June 29, 1895	329,010	90,147
	Catinat (Ex.P.)	Soc. de la Méditerranée . .	Feb. 14, 1894	Feb. 26, 1897	328,228	57,049
	E 4 (New Ship)	..	..	..	329,325	19,600
	D'Assas . . .	Soc. de la Loire	Nov. 15, 1893	Oct. 1, 1896	303,729	124,619
Third-class Protected Cruisers	Linois . . .	Soc. de la Méditerranée . .	Aug. 3, 1892	Oct. 12, 1894	202,045	53,458
	K 1	..	..	..	172,296	17,760
	K 2	..	..	..	172,296	17,760
Torpedo Cruiser	Foudre . . .	Soc. de la Gironde	June 8, 1892	Nov. 6, 1895	420,538	91,398
Torpedo Gunboats	Cassini . . .	Soc. de la Méditerranée . .	Nov. 16, 1892	Jan. 28, 1895	114,440	24,960
	Casabianca . .	Soc. de la Gironde	Aug. 9, 1893	June 28, 1895	101,885	36,911
Gunboat . .	Surprise . .	Normand . .	Mar. 29, 1893	Oct. 8, 1894	49,924	22,600
Sea-going Torpedo Boats . . .	Lansquenet . .	Oriolle . . .	Mar. 23, 1892	..	25,081	2,280
	Flibustier . .	Normand . .	Aug. 31, 1892	Nov. 7, 1894	24,084	4,720
			Carried forward	£	8,955,047	1,598,588

Authorised Programme of New Construction, to be continued or undertaken in 1895.—Building by Contract—*continued.*

Class.	Names of Ships.	Contractors.	Date of Contract.	Date of Completion.	Total Estimated Cost.	Expenditure proposed for 1895.
					£	£
			Brought	forward .	8,955,047	1,598,588
Sea-going Torpedo Boats .	Ariel . . .	Normand . .	Aug. 31, 1892	Dec. 7, 1894	24,084	7,584
	Aquilon . . .	Normand . .	July 12, 1893	May 20, 1895	26,377	12,031
	Mangini . .	..	..	..	26,380	14,509
	Tenare . . .	..	..	..	26,380	2,760
	Forban . . .	Normand . .	Feb. 15, 1893	Nov. 23, 1894	38,968	20,480
First-class Torpedo Boats .	Three—155to157	Soc. de la Gironde	April 9, 1890	End 1894	48,447	15,650
	Three—158to160	Soc. des Établissements Cail	April 9, 1890	End 1894	48,447	15,650
	One—185 . .	Normand . .	July 27, 1892	Oct. 24, 1894	17,169	640
	Two—186, 187 .	Normand . .	July 27, 1892	Dec. 4, 1894	34,339	6,898
	One—189 . .	Soc. de la Méditerranée . .	Oct. 12, 1892	Aug. 6, 1894	16,110	800
	One—190 . .	Soc. de la Méditerranée . .	Oct. 12, 1892	Aug. 22, 1894	16,110	800
	One—191 . .	Soc. de la Méditerranée . .	Oct. 12, 1892	Sept. 22, 1894	16,110	3,270
	One—192 . .	Soc. de la Gironde	Oct. 12, 1892	May 6, 1894	16,150	800
	One—193 . .	Soc. de la Gironde	Oct. 12, 1892	June 6, 1894	16,150	800
	One—194 . .	Soc. de la Gironde	Oct. 12, 1892	July 6, 1894	16,150	800
	One—195 . .	Soc. Cail . . .	Nov. 23, 1892	June 1, 1894	15,993	1,292
	One—196 . .	Soc. Cail . . .	Nov. 23, 1892	July 1, 1894	15,993	1,292
	One—197 . .	Soc. Cail . . .	Nov. 23, 1892	Aug. 1, 1894	15,993	3,644
	One—198 . .	Soc. Cail . . .	Nov. 23, 1892	Sept. 1, 1894	15,993	3,644
	One—199 . .	Soc. Cail . . .	June 14, 1893	Nov. 22, 1894	15,588	3,640
	One—200 . .	Soc. Cail . . .	June 14, 1893	Nov. 22, 1894	15,588	3,640
	Five—P20 to P24	..	..	..	83,005	12,056
Third-class Torpedo Boats (for carrying on board ship) .	One—A . . .	Schneider . .	Aug. 2, 1892	July 22, 1894	5,444	700
	One—B . . .	..	Aug. 2, 1893	Aug. 22, 1894	5,444	700
	One—C . . .	..	Aug. 16, 1893	July 31, 1894	5,196	840
	Five—R 4 to R 8	..	..	..	22,176	14,240
	Total Building by Contract . . . . £				9,558,831	1,747,748

German Navy Estimates, 1895–96.

ORDINARY PERMANENT ESTIMATES.

—	Proposed for 1895–96.	Granted for 1894–95.
	£	£
Naval Cabinet and Chief Command Department	1,840	1,665
Imperial Naval Office	47,514	46,747
Observatories	13,840	13,654
Salaries, Wages, &c., Scientific Department	13,986	13,372
Martial Law	1,622	1,598
Divine Service and Schools	3,197	3,070
Military Personnel	607,767	569,640
Maintenance of Ships and Vessels in Commission	622,236	543,640
Victualling	37,014	42,444
Clothing	12,252	12,270
Barrack Administration, Cashiers, and Accountants	64,114	63,130
Lodging Allowance	49,574	47,595
Medical	46,740	44,243
Travelling Expenses, Freight Charges, &c.	65,555	71,685
Training Establishments	10,551	10,054
Dockyard Expenses	893,264	760,124
Ordnance and Fortification	241,404	226,037
Accountant-General's Department	19,136	18,193
Pilotage and Surveying Services	19,844	19,407
Miscellaneous Expenses	28,283	26,238
Total . . . . . £	2,799,733	2,534,806

Special Ordinary Estimates.

Shipbuilding Programme, 1895–1896.

For the Construction of—	£
Ironclad 4th class Aegir (ex T), 4th and last instalment . .	73,500
,, ,, Odin, 4th and last instalment.	73,500
,, 1st class, to replace Preussen, 2nd instalment . .	125,000
Torpedo-boats, 2nd and final instalment	88,800
Cruiser 1st class, to replace Leipzig, 1st instalment . . .	50,000
,, 2nd ,, K, ,, ,, ...	100,000
,, ,, L, ,, ,, ...	100,000
,, ,, to replace Freya ,, ,, ...	100,000
Divisional Torpedo-boats ,, ,, ...	25,000
Eight Torpedo-boats ,, ,, ...	120,000
Removing engines and boilers of ships of Sachsen class, 1st instalment	82,000
Total	£937,800

Note.—£686,765 was asked for in 1894–5, but it was reduced to £576,765.

Summary.

——	1895–96.	1894–95.
	£	£
Ordinary Permanent Estimates	2,799,733	2,534,806
Shipbuilding	937,800	576,765
Armaments	269,735	396,165
Other Items	110,422	66,933
Extraordinary Estimates (exclusive of sum contributed to the Ordinary Estimates)	200,435	121,480
Total . . . . . £	4,318,125	3,696,149

Italian Estimates, 1895–96.

NAVY ESTIMATES.—FINANCIAL YEAR, 1ST JULY, 1895, TO 30TH JUNE, 1896.

ORDINARY EXPENDITURE—GENERAL EXPENSES.	1895–6.	1894–5.
	£	£
Admiralty	41,960	45,960
Expenditure on various services connected with the Mercantile Marine	133,230	152,763*
Total . . £	175,190	198,723
EXPENDITURE FOR NAVAL SERVICES.		
Ships fitting out, in reserve and completing	212,000	192,000*
General Staff of the Navy	127,897	123,765
Corps of Constructors	43,040	42,147*
Commissariat Service	36,065	38,478*
Medical Service	25,963	26,674*
Wages—Men	443,200	441,200*
Gratuities	33,000	33,000*
Assistants to Constructors	43,611	44,611*
Accountants	34,812	34,012*
Police	10,760	10,762
Telegraph Service	6,207	6,233*
Telegraph Materials	7,400	7,400*
Provisions	294,000	283,231*
Lighting	7,441	7,441
Hospital Services	17,620	17,820*
Honorary Distinctions	560	640
Fuel	163,840	159,840
Salaries and Wages—Workshops and Fortifications	6,064	7,104*
Training Establishments	15,655	18,610*
Naval Academy	5,600	8,000*
Scientific Services—*Personnel*	1,384	1,384*
,, ,, *Matériel*	10,400	10,400
Law Charges	1,200	1,200
Transport	22,000	19,600*
Materials for repair of Ships	258,400	272,000
Labour for same	225,800	237,773
Carried forward . . . . £	2,053,919	2,045,325

* These figures are taken from the most recent estimates, and differ from those given in last year's *Annual*.

———	1895-6.	1894-5.
	£	£
Brought forward	2,053,919	2,045,325
Guns, Torpedoes and Small Arms	369,600	384,800
Labour for construction and repairs of Armaments	82,000	86,168
Works Department—Repairs	65,000	65,000
Construction and Completion of the following Vessels, viz.: Battleships: Ammiraglio di Saint Bon, at Venice; Emanuele Filiberto, at Castellamare. Cruisers: Calabria, at Spezia; Puglia at Taranto. 2nd Class Armoured Cruisers: Carlo Alberto, at Spezia; Vettor Pisani, at Castellamare; Giuseppe Garibaldi, by Messrs. Ansaldo; Varese, by Messrs. Orlando. Torpedo Cruiser: Governolo, at Venice. Torpedo Catchers. Torpedo Boats. Small Craft	912,000	934,400
Total £	3,482,519	3,515,693

EXTRAORDINARY EXPENDITURE.

	£	£
Half Pay	1,040	1,200*
Mercantile Marine—Construction at Naples	3,800	7,200
Naval Yard at Taranto	..	44,000
Coast Defence	4,000	4,000
Fortifications, Maddalena	8,000	20,000
Torpedoes	40,000	44,000
Total £	55,800	119,200

SUMMARY.

	£	£
Admiralty and Mercantile Marine	175,190	198,723
Naval Services	3,482,519	3,515,693
Extraordinary Expenditure	55,800	119,200
Grand Totals £	3,713,509	3,833,616

* These figures are taken from the most recent estimates, and differ from those given in last year's *Annual*.

Russian Navy Estimates, 1895.

Calculated at £1 = 9 Roubles.

———	1895.	1894.
	£	£
Central Administration	203,161	199,832
Rewards, Pensions, Education of Children	47,946	47,944
Naval Schools	67,931	65,147
Medical	96,461	90,222
Wages	397,753	374,005
Provisions	113,349	103,325
Clothing	152,556	132,667
Navigation	799,421	764,193
Hydrographic Office	58,480	58,234
Guns, Torpedoes, and Electric Light	663,123	672,355
Construction	2,120,604	2,255,627
Workshops and Offices	350,239	341,949
Hire, Maintenance, Construction, and Repair of Buildings .	405,236	396,073
Religion	53,222	50,888
Exchange on Sveaborg expenditure	13,540	7,606
Port Fittings at Liban and Construction of Dock at Vladivostok	377,256	355,333
Conversion of Guns.	36,000	77,778
Expenditure on account of Estimates for 1896 . . .	42,634	20,711
Sundries	103,700	111,599
Total . . . . £	6,102,612	6,125,488

United States Navy Estimates, 1895-96.

Calculated at £1 = $5.

Detailed objects of Expenditure and Appropriations.	Estimates, 1895.	Appropriations, 1895 (current Year).	Estimates, 1896.
General Establishment—	£	£	£
Pay of the Navy . . .	1,495,000	1,496,100	1,494,570
Pay, miscellaneous . .	48,000	48,000	48,000
Contingent Navy . .	1,400	1,400	1,400
Bureau of Yards and Docks—			
Ordinary Expenses . .	140,762	141,392	161,182
Public Works . . .	80,766	110,465	208,962
Bureau of Navigation—			
Ordinary Expenses . .	55,350	27,800	61,450
Naval Academy . . .	39,420	43,020	40,020
Bureau of Equipment. . .	226,205	224,205	261,805
Bureau of Ordnance . . .	129,160	75,760	325,376
Bureau of Construction . .	183,995	215,595	203,995
Bureau of Steam Engineering .	203,580	183,580	232,580
Bureau of Supplies and Accounts	257,506	257,506	257,506
Bureau of Medicine and Surgery.	25,000	25,000	25,360
Marine Corps—			
Pay Department . . .	140,400	140,164	140,164
Quartermaster's Department.	52,842	53,442	57,756
Naval Observatory . . .	4,791	4,791	18,400
Hydrographic Office . . .	2,000	2,800	..
Total running Expenses .	3,086,177	3,051,020	3,538,526
Increase, Navy—			
Bureau of Equipment . .	..	..	28,500
Bureau of Ordnance . .	1,300,000	823,400	1,047,534
Construction and Machinery	1,191,005	1,198,945	1,575,844
Total increase, Navy .	2,491,005	2,022,345	2,651,878
Grand Total . . .	£5,577,182	£5,073,365	£6,190,404

Comparative Tables of British, French, and Russian Ships.

Table I.—First-Class Battleships.

ENGLAND.			FRANCE.			RUSSIA.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		Tons.			Tons.*			Tons.
1886	Anson	10,600	1883	Amiral Baudin	11,380	1886	Catherine II.	10,180
1893	Barfleur	10,500	1879	Amiral Duperré	10,487	1892	Gheorghy Pobyedonosets	10,280
1885	Benbow	10,600	Bldg.	Bouvet	12,200	1891	Navarin	9,476
1885	Camperdown	10,600	1891	Brennus	11,000	Bldg.	Petropaulowski	10,960
1892	Centurion	10,500	1893	Charles Martel	11,882	Bldg.	Poltava	10,960
1882	Collingwood	9,500	Bldg.	Charlemagne	11,232	Bldg.	Sevastopol	10,960
1891	Empress of India	14,150	1881	Courbet	9,652	1887	Sinope	10,180
1891	Hood	14,150	1879	Dévastation	9,639	1886	Tchesmé	10,180
1885	Howe	10,300	1885	Formidable	11,441	1893	Tri Sviatitelia	12,480
1894	Magnificent	14,900	Proj.	Gaulois	11,232			
1895	Majestic	14,900	1886	Hoche	10,650			
1888	Nile	11,940	1893	Jauréguibery	11,824			
1892	Ramillies	14,150	Bldg.	Lazare Carnot	12,008			
Bldg.	Renown	12,350	1890	Magenta	10,600			
1892	Repulse	14,150	1887	Marceau	10,581			
1892	Resolution	14,150	Bldg.	Masséna	11,900			
1892	Revenge	14,150	1887	Neptune	10,630			
1884	Rodney	10,300	Bldg.	St. Louis	11,232			
1892	Royal Oak	14,150						
1891	Royal Sovereign	14,150						
1887	Sans Pareil	10,470						
1887	Trafalgar	11,940						
	Cæsar	14,900						
	Hannibal	14,900						
	Illustrious	14,900						
	Jupiter	14,900						
	Mars	14,900						
	Prince George	14,900						
	Victorious	14,900						
	Total 29 Ships	376,900		Total 18 Ships	199,570		Total 9 Ships	95,656

* French tons.

TABLE II.—SECOND-CLASS BATTLESHIPS.

ENGLAND.			FRANCE.			RUSSIA.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		Tons.			Tons.			Tons.
1879	Agamemnon	8,660	1892	Bouvines	6,610	1887	Alexander II.	8,440
1880	Ajax	8,660	1885	Caiman	7,200	Bldg.	Cizoi Veliky, No. 1. ..	8,880
1882	Edinburgh	9,490	1875	*Colbert	8,457	Bldg.	Cizoi Veliky, No. 3 ..	8,880
1875	Alexandra	9,420	1873	Friedland	8,824	1890	Dvenadsat Apostoloff	8,076
1882	Colossus	9,330	1883	Indomptable	7,168	1890	Gangoot	6,592
1871	Devastation	10,820	1876	Redoutable	8,860	1889	Nicolai I.	8,440
1875	Dreadnought	9,420	1885	Requin	7,200	1872	Peter the Great.. ..	8,750
1876	Inflexible	11,880	1873	*Richelieu	8,767	Bldg.	Rostislav (Ciz. Vel. No. 2)	8,880
1874	Neptune	9,310	1881	Terrible	7,713			
1875	Superb	9,170	1893	Tréhouart	6,610			
1876	Téméraire	8,540	1876	*Trident	8,456			
1872	Thunderer	9,330						
	Total 12 Ships ..	114,030		Total 11 Ships ..	85,865		(z) Total 8 Ships ..	66,938

* These ships are built of wood. (z) Another ship of the Cizoi Veliky type is projected.

TABLE III.—THIRD-CLASS BATTLESHIPS.

ENGLAND.			FRANCE.			RUSSIA.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		Tons.			Tons.			Tons.
1869	Audacious	6,010	1872	La Galissonnière*	4,700	Nil.	Nil.	Nil.
1865	Bellerophon	7,550	1869	Marengo*	7,748			
1881	Conqueror	6,200	1868	Océan*	7,750			
1868	Hercules..	8,680	1870	Suffren	7,782			
1885	Hero	6,200	1877	Triomphante	4,700			
1869	Invincible	6,010	1875	Victorieuse*	4,700			
1870	Iron Duke	6,010						
1868	Monarch..	8,320						
1870	Sultan	9,290						
1870	Swiftsure..	6,910						
1870	Triumph..	6,640						
	Total 11 Ships.. ..	77,820		Total 6 Ships	37,380			

* "En cours de condamnation."

Table IV.—Look-Out Ships.

England.			France.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
Knots.		Tons.	Knots.		Tons.
17	Alacrity	1,700	$19\frac{1}{4}$	Coëtlogon	1,848
$16\frac{1}{2}$	Archer	1,700	$17\frac{3}{4}$	Condor	1,240
$17\frac{3}{4}$	Barham	1,830	$20\frac{1}{2}$	Cosmao	1,877
$16\frac{3}{4}$	Barracouta	1,500	17	Epervier	1,240
$16\frac{3}{4}$	Barrosa	1,580	$17\frac{1}{2}$	Faucon	1,240
$17\frac{3}{4}$	Bellona	1,830	18	Fleurus (x)	1,310
$16\frac{3}{4}$	Blanche	1,580	$20\frac{1}{2}$	Forbin	1,848
$16\frac{3}{4}$	Blonde	1,580	$20\frac{1}{2}$	Lalande	1,877
$16\frac{1}{2}$	Brisk	1,770	$20\frac{1}{2}$	Surcouf	1,848
$16\frac{1}{2}$	Cossack	1,770	$20\frac{1}{2}$	Troude	1,877
$16\frac{3}{4}$	Fearless	1,580	$17\frac{1}{2}$	Vautour	1,280
18	Iris	3,730	$18\frac{1}{2}$	Wattignies	1,310
18	Mercury	3,730			
$16\frac{1}{2}$	Mohawk	1,770			
$16\frac{1}{2}$	Porpoise	1,770			
$17\frac{1}{2}$	Racoon	1,770			
$16\frac{3}{4}$	Scout	1,580			
17	Surprise	1,700			
$16\frac{1}{2}$	Tartar	1,770			
	Total 19 Ships	36,240		Total 12 Ships	18,795

(x) Will receive new boilers.

TABLE V.—COAST DEFENCE SHIPS.

ENGLAND.			FRANCE.			RUSSIA.		
Launched.	Name.	Displacement.	Launched.	Name.	Displacement.	Launched.	Name.	Displacement.
		Tons.			Tons.			Tons.
1870	Abyssinia (*a*)	2,900	1885	Achéron	1,640	1868	Admiral Chicagoff ..	3,511
1876	Belleisle	4,870	1887	Cocyte	1,640	1868	Admiral Greig	3,593
1870	Cerberus (*b*)	3,480	1885	Flamme	1,046	1867	Admiral Lazareff ..	3,556
1871	Cyclops	3,560	1877	Fulminant	5,651	Bldg.	Admiral Ortshakoff ..	4,126
1871	Glatton	4,910	1883	Furieux	6,000	Bldg.	Admiral Senjavin ..	4,126
1871	Gorgon	3,560	1884	Fusée	1,150	1868	Admiral Spiradoff ..	3,500
1871	Hecate	3,560	1888	Grenade	1,046	1867	Charodeika	2,026
1870	Hotspur	4,010	1892	Jemmapes	6,590	Bldg.	General Admiral Apraxine	4,126
1871	Hydra	3,560	1886	Mitraille	1,130	1892	Gremyastchy	1,500
1870	Magdala (*a*)	3,340	1892	Phlégéton	1,790	1890	Grozyashtchy	1,492
1879	Orion	4,870	1892	Styx	1,790	1865	Kreml	3,480
1867	Penelope (*c*)	4,470	1876	Tempête	4,869	1864	Netron-Menya	3,494
1872	Rupert	5,440	1880	Tonnant	5,100	1873	Novgorod	2,706
			1875	Tonnerre	5,589	1892	Otvazny	1,500
			1892	Valmy	6,590	1863	Pervenetz	3,279
			1878	Vengeur	4,700	1875	Vice-Admiral Popoff	3,590
	Total 13 Ships*	52,530		Total 16 Ships	56,321		Total 16 Ships ..	49,605

(*a*) Indian Marine at Bombay. (*b*) Victorian Marine. (*c*) At Cape Town. May be classified as third-class battleship.
* The Scorpion, Wivern, and Prince Albert are omitted.

TABLE VI.—ARMOURED AND PROTECTED CRUISERS.—FIRST CLASS.

ENGLAND.			FRANCE.			RUSSIA.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
Knots.		Tons.	Knots.		Tons.	Knots.		Tons.
18½	Aurora .. .. .. A.	5,600	19	Bruix (a) .. .. .. A.	4,745	16½	Admiral Nachimoff ..	7,782
18½	Australia .. .. "	5,600	19	Chanzy (a) .. .. .. "	4,745	15½	Dimitri Donskoi	5,893
18½	Galatea .. .. .. "	5,600	19	Charner (a) .. .. .. "	4,745	18	Pamyat Azova	6,000
18½	Immortalité .. .. "	5,600	14	Duguesclin .. .. .. "	5,894	18	Rurik	10,923
16¾	Impérieuse .. .. "	8,400	20	Dupuy de Lôme .. "	6,297	18	Rossia (a)	12,130
18½	Narcissus .. .. "	5,600	19	Latouche Tréville .. "	4,745	12	General Admiral	4,604
14½	Nelson .. .. .. "	7,630	20	Pothuau (a) .. .. "	5,320	13	Gerzog Edinburgski ..	4,604
13¼	Northampton .. .. "	7,630	14	Bayard .. .. .. "	5,986	12½	Kniaz Pojarski	5,007
18½	Orlando .. .. .. "	5,600	14	*Turenne .. .. .. "	6,400	13	Minin	5,740
12½	Shannon .. .. .. "	5,390	14	Vauban .. .. .. "	6,150	17	Vladimir Monomach ..	5,796
18½	Undaunted .. .. "	5,600	19	Cecille .. .. P.	5,766			
16¾	Warspite .. .. .. "	8,400	19	D'Entrecasteaux (a) .. "	8,114			
14½	Achilles .. .. .. "	9,820	19	Tage .. .. "	7,345			
14¾	Agincourt .. .. "	10,690						
14	Black Prince .. "	9,210						
14½	Minotaur .. .. "	10,690						
14¼	Northumberland .. "	10,780						
22	Blake .. .. .. P.	9,000						
22	Blenheim .. .. "	9,000						
19¾	Crescent .. .. .. "	7,700						
20½	Edgar .. .. .. "	7,350						
20	Endymion .. .. "	7,350						
19¾	Gibraltar .. .. "	7,700						
20	Grafton .. .. .. "	7,350						
20	Hawke .. .. .. "	7,350						
22	Powerful (a) .. .. "	14,200						
19¾	Royal Arthur .. .. "	7,700						
19¾	St. George .. .. "	7,700						
22	Terrible (a) .. .. "	14,200						
20	Theseus .. .. .. "	7,350						
	Total 30 Ships (x) ..	241,790		Total 15 Ships (b)	76,252		Total 10 Ships (c) ..	68,479

(a) Ships building or completing.. (b) Two large fast cruisers are to be laid down. (c) A large cruiser is projected.
(x) The programme for 1895-96 provides for commencing four first-class cruisers—improved Blenheims. * Built of wood.

TABLE VII.—PROTECTED CRUISERS—SECOND AND THIRD CLASSES.

ENGLAND.			FRANCE.			RUSSIA.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
Knots.		Tons.	Knots.		Tons.	Knots.		Tons.
19¾	Æolus	3,600	19½	Alger	4,122	17½	Admiral Korniloff	5,000
17	Amphion	4,300	19¼	Bugeaud (a)	3,722	15½	Pamyat Merkuriya ..	3,050
20	Andromache	3,400	19	Catinat (a)	3,998	15	Rynda	2,950
20	Apollo..	3,400	19	Cassard (a)	3,972			
17	Arethusa	4,300	19¼	Chasseloup-Laubat ..	3,722			
19½	Astræa	4,360	20	Davout	3,027			
19½	Bonaventure	4,360	19	D'Assas (a)	3,992			
19¾	Brilliant	3,600	19	Descartes (a)	3,980			
19½	Cambrian	4,360	19	Duchayla (a)	3,992			
19½	Charybdis	4,360	19	E 4 (a)	3,800			
19½	Diana (a)	5,600	19¼	Friant	3,722			
19½	Dido (a)	5,600	20	Galilée (a)	2,317			
19½	Doris (a)	5,600	19	Isly	4,160			
19½	Eclipse (a)	5,600	19	Jean Bart	4,160			
19½	Flora	4,360	20	Lavoisier (a)	2,300			
19½	Forte	4,360	20	Linois (a)	2,270			
17	Forth	4,050	19¼	Pascal (a)	3,988			
19½	Fox	4,360	17	Sfax..	4,502			
19½	Hermione	4,360	20	Suchet	3,430			
19¾	Indefatigable	3,600						
19¾	Intrepid	3,600						
19¾	Iphigenia	3,600						
19½	Isis (a)	5,600						
19½	Juno (a)	5,600						
19	*Katoomba	2,575						
20	Latona	3,400						
17	Leander	4,300						
19	Magicienne..	2,950						
19	Marathon	2,950						
19	Medea..	2,800						
19	Medusa	2,800						
20	Melampus	3,400						
19	Melpomene..	2,950						
17	Mersey	4,050						
19	*Mildura	2,575						

19½	Minerva (a)	5,600						
20	Naiad	3,400						
19	Pallas	2,575						
19	Pearl	2,575						
17	Phaeton	4,300						
19	Philomel	2,575						
19	Phœbe..	2,575						
19¾	Pique	3,600						
19¾	Rainbow	3,600						
19¾	Retribution	3,600						
19	*Ringarooma	2,575						
20	Sappho	3,400						
20	Scylla	3,400						
17	Severn..	4,050						
19¾	Sirius	3,600						
19¾	Spartan	3,600						
20	Sybille	3,400						
19½	Talbot (a)	5,600						
19	*Tauranga	2,575						
20	Terpsichore	3,400						
17	Thames	4,050						
20	Thetis	3,400						
20	Tribune	3,400						
19½	Venus (a)	5,600						
19	*Wallaroo	2,575						
	Total 60 Ships (x) ..	229,605		Total 19 Ships † ..	69,176		Total 3 Ships	11,000

* Australian Defence. † Two cruisers of 2100 tons projected. (a) Ships building or completing.

(x) The programme for 1895-96 provides for commencing four second class and two third class cruisers.

Table VIII.—Torpedo Gun Boats.

England.			France.			Russia.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
Knots.		Tons.	Knots.		Tons.	Knots.		Tons.
19	Alarm	810	18½	Bombe	395	20	Captain Sacken	700
19	Antelope	810	21½	Casabianca (b)	945	22	Gaidamak	500
20	Assaye (a)	735	21½	Cassini (b)	945	22	Griden	400
20	Boomerang	735	18	Couleuvrine	395	21	Kazarsky	411
19	Circe	810	18	Dague	395	20	Lieutenant Ilyn	600
19	Dryad	1,070	21½	D'Iberville	925	22	Posadnik	400
20	Gleaner	735	18	Dragonne	395	22	Voevada	400
19	Gossamer	735	18	Flèche	395	22	Vzadnik	500
19	Grasshopper	525	18	Lance	395			
19	Halcyon	1,070	18¾	Léger	450			
19	Harrier	1,070	18½	Lévrier	450			
19	Hazard	1,070	18	Sainte-Barbe	395			
19	Hebe	810	18	Salve	395			
19	Hussar	1,070						
19	Jascur	810						
20	Jason	810						
20	Karrakatta	735						
19	Leda	810						
19	Niger	810						
19	Onyx	810						
20	Plassy (a)	734						
18	Polyphemus	2,640						
18½	Rattlesnake	550						
19	Renard	810						
20	Salamander	735						
19	Sandfly	525						
20	Seagull	735						
20	Sharpshooter	735						
20	Sheldrake	735						
20	Skipjack	735						
20	Spanker	735						
20	Speedwell	735						
20¼	Speedy	810						
19	Spider	525						
	Total 34 Vessels ..	28,580		Total 13 Vessels ..	6,875		Total 8 Vessels ..	3,911

(a) Indian Marine. (b) Ships building or completing.

TABLE IX.—COMPARATIVE STATEMENT SHOWING EXPENDITURE ON CONSTRUCTION OF NEW VESSELS, HULLS AND MACHINERY, IN ENGLAND AND FRANCE, FROM 1869–70 TO 1895–96.

Year.	England.	France.
	£	£
1869–70	1,387,047	655,016
1870–71	1,330,814	411,948
1871–72	1,184,172	429,832
1872–73	809,087	614,460
1873–74	1,290,028	789,684
1874–75	1,528,161	921,380
1875–76	1,613,218	1,054,560
1876–77	2,121,960	1,301,988
1877–78	2,922,442	1,501,884
1878–79	1,508,049	1,504,656
1879–80	1,388,607	1,375,296
1880–81	1,426,349	1,345,084
1881–82	1,682,500	1,400,152

Year.	England.	France.
	£	£
1882–83	1,767,014	1,559,644
1883–84	1,930,090	1,536,508
1884–85	2,242,070	1,510,704
1885–86	3,737,000	1,355,684
1886–87	3,495,000	1,280,000
1887–88	2,819,537	2,510,020
1888–89	2,398,805 *190,842	1,848,930
1889–90	2,455,997 a984,314 3,440,311	1,759,684
1890–91	2,769,651 a2,656,695 5,426,346	2,396,000

Year.	England.	France.
	£	£
1891–92	3,026,449 a2,653,670 5,680,119	2,800,000
1892–93	2,498,213 a1,788,695 4,286,908	2,800,000
1893–94	980,319 a2,244,106 3,224,425	2,918,120
1894–95	4,804,877 a9,495 b4,814,372	3,049,720
1895–96 (Navy Estimates) ..	5,730,020	3,033,400

* Expenditure on ships building under the Imperial Defence Act of 1888.

(*a*) Provided for under Naval Defence Act. (*b*) Navy Estimates for 1894–95.

DIAGRAM SHEWING THE EXPENDITURE UPON THE CONSTRUCTION OF NEW SHIPS DURING THE 24 YEARS BETWEEN 1872-73 AND 1895-96

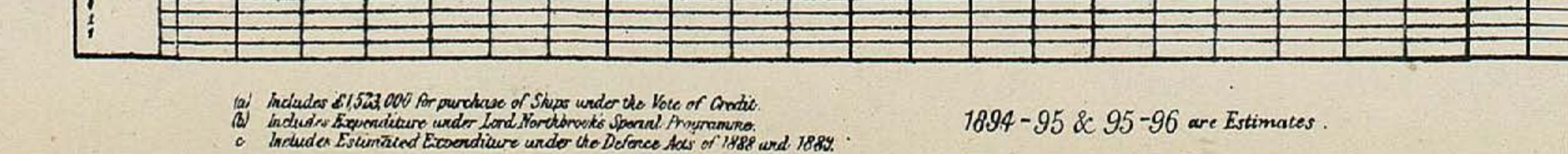
EXPENDITURE £.

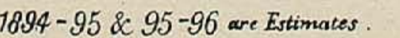
FINANCIAL YEAR.

1872-3, 1873-4, 1874-5, 1875-6, 1876-7, 1877-8, 1878-9, 1879-80, 1880-1, 1881-2, 1882-3, 1883-4, 1884-5, 1885-6, 1886-7, 1887-8, 1888-9, 1889-90, 1890-1, 1891-2, 1892-3, 1893-4, 1894-5, 1895-6

EXPENDITURE £.

7,000,000, 6,000,000, 5,000,000, 4,000,000, 3,000,000, 2,000,000, 1,000,000


(a) Includes £1,523,000 for purchase of Ships under the Vote of Credit.
(b) Includes Expenditure under Lord Northbrook's Special Programme.
c Includes Estimated Expenditure under the Defence Acts of 1888 and 1889.


1894-95 & 95-96 are Estimates.

Note. The distance at any point of the drawn line from the base represents on the scale of £s, the ORDINARY expenditure of the year marked by that point. The distance at any point of the dotted line from the base represents on the scale of £s, both the ORDINARY and the EXTRAORDINARY expenditure of the year marked by that point.

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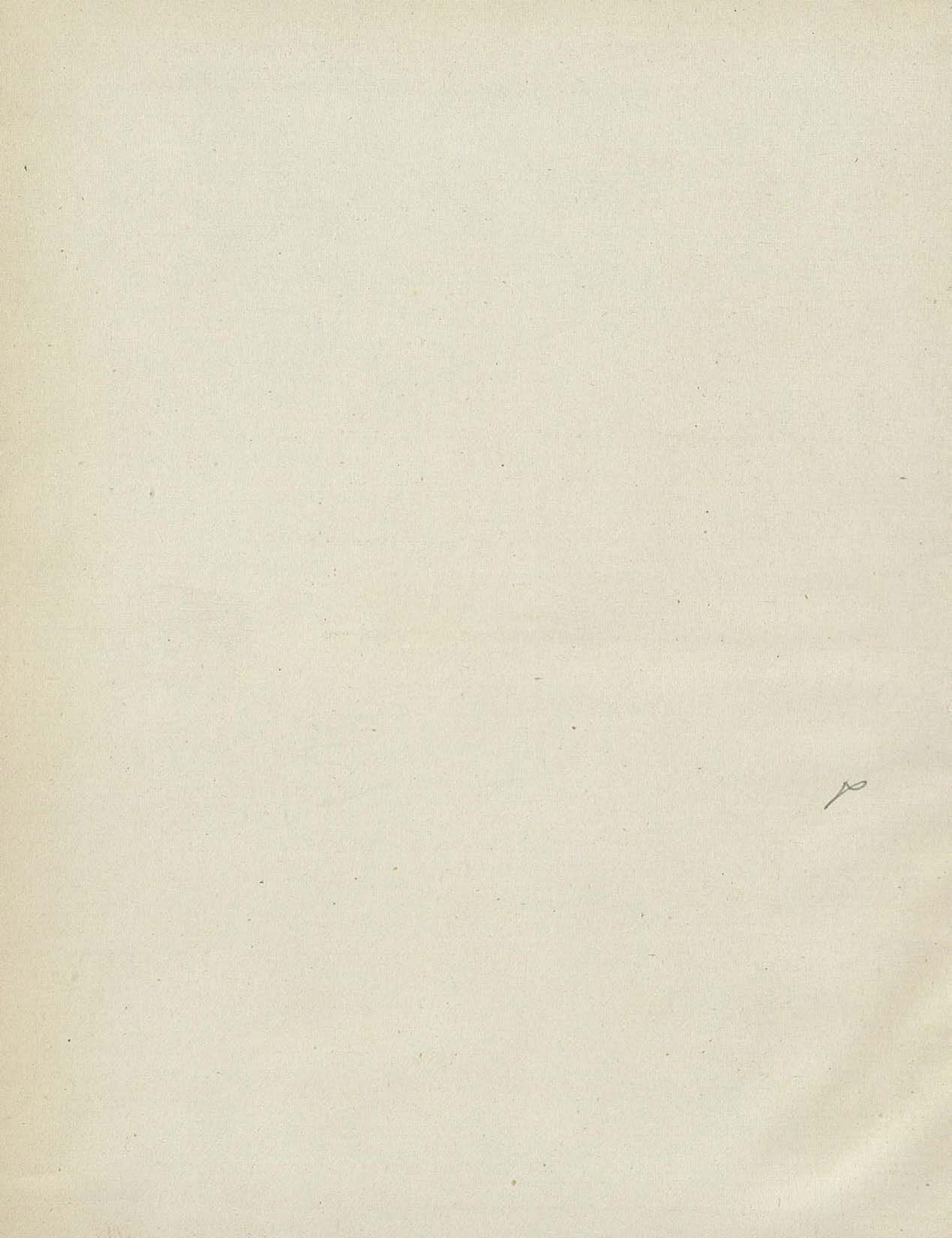
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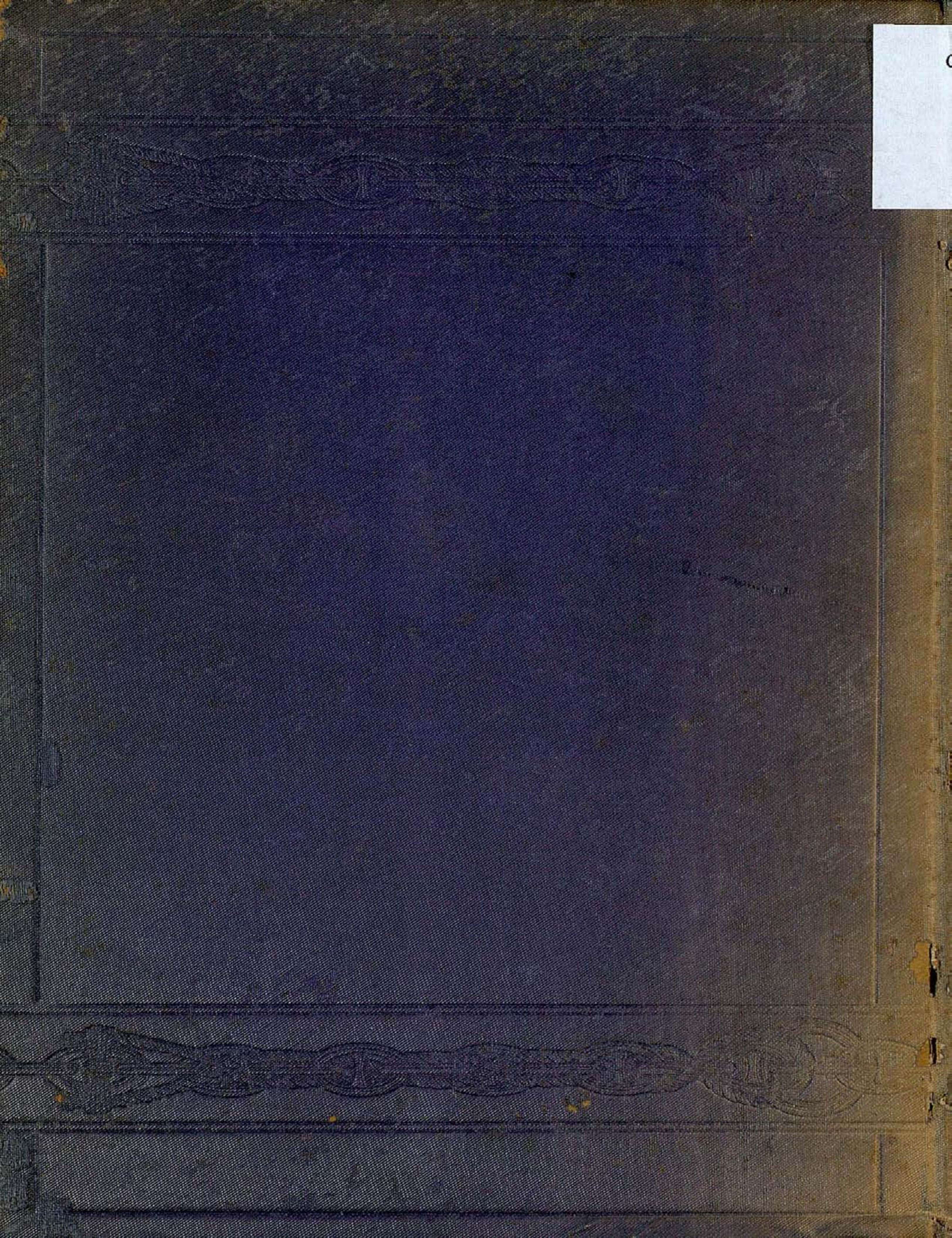
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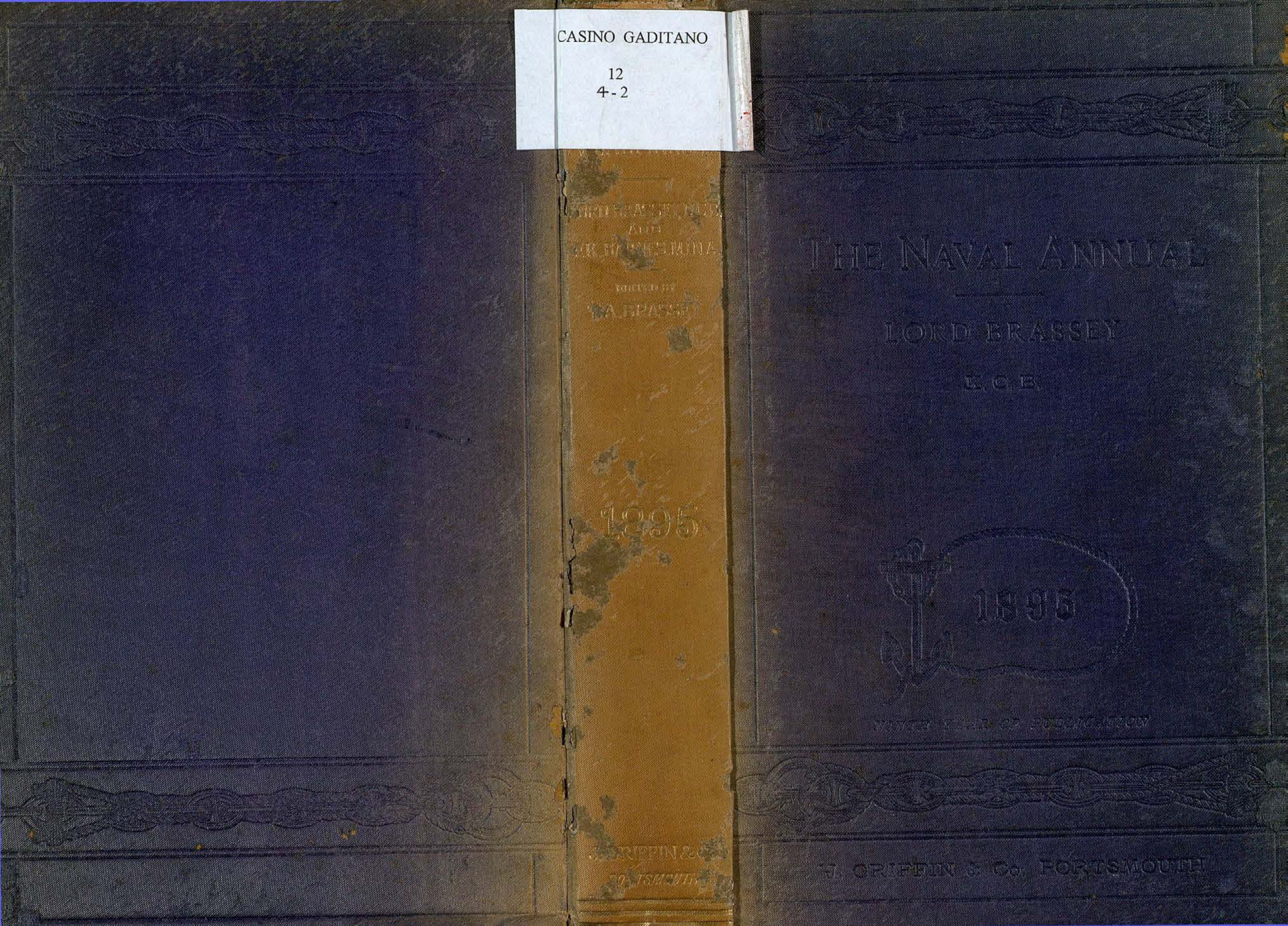
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THE NAVAL ANNUAL
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1895